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AN EXAMINATION OF SOME ECONOMIC ASPECTS OF FOREST SERVICE
STUMPAGE PRICES AND APPRAISAL POLICIES

---²Sidney Weintraub, Ph. D.---
Professor of Economics, University of Pennsylvania

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FOREWORD

The attached report by Dr. Sidney Weintraub entitled, "An Examination of Some Economic Aspects of Forest Service Stumpage Prices and Appraisal Policies" is the result of his services as a consultant on a part-time basis over a six-month period ending in June 1958. Dr. Weintraub's services were obtained particularly to get the advice of a professional economist of stature and reputation with special competence in the area of price analysis. Dr. Weintraub is the author of an advanced volume on Price Theory, another on Income and Employment Analysis, and most recently, a work on Income Distribution. He has also published numerous articles over the past twenty years in all of the leading American and English professional economic journals. He has had several years of previous experience with private and public research agencies. Since 1950 he has been teaching almost wholly at the graduate level, at the University of Pennsylvania.

Dr. Weintraub was asked to consider profit trends in the lumber industry, their relationship to invested capital and the relationships between profit requirements based on invested capital to profit margins indicated from analysis of prices paid for stumpage in actual transactions. He was given a free hand to pry into any phase of timber economics and Forest Service appraisal policies which he considered would throw light on these general topics. His report constitutes a discussion of the areas into which he inquired.

Several segments of the forest products industry expressed considerable interest when it was announced that Dr. Weintraub had been employed as a consultant. The work was started without expectation that a statement suitable for outside distribution would result. However, in view of the interest expressed by the forest products industry the Forest Service is making his report available to those requesting it.

The views and conclusions expressed in Dr. Weintraub's report are his own. These views, conclusions and recommendations are of an advisory nature from a professional economist without previous experience in the forest products industry, in timber appraisal or in the conduct of sales of stumpage. His work throws light on appraisal and profit determination problems from a new angle. His report is primarily for use as background material by those responsible for formulating Forest Service appraisal policies. It should not be considered as direct recommendations for policy revision.

EDWARD P. CLIFF
Assistant Chief

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Mr. Ira J. Mason, Director
Division of Timber Management
United States Forest Service
Department of Agriculture

Dear Mr. Mason:

I am now transmitting the report I agreed to make on some economic aspects of the lumber industry, with particular emphasis on profit ratios and Forest Service appraisal techniques. I think the pages below cover most of the ground we originally agreed upon for preliminary survey and investigation. At the close there is an attempt to summarize some of the main conclusions and also, to offer some recommendations for research and the accumulation of data within the Forest Service in order to remedy deficiencies in information which can prove helpful in evaluating the impact of appraisal policy over time.

As you are aware from our discussions, the report is incomplete in the sections dealing with profit trends in the lumber industry despite my several attempts, with the aid of your good offices, to fill this gap. Neither the available firm records nor the accessible Internal Revenue data have proved sufficient. I suggest that a study to fill this void be undertaken in view of the importance of these facts. Despite the limitation in this respect I am submitting the report at this time because to delay it further would defer a consideration of other matters that I also deem important; too, there has been the understandable desire to have at least a progress report on the results of my survey of Forest Service price problems over the last half-year.

I have devoted considerable attention to the method of transactions analysis used in Forest Service appraisals and have come to have a high respect for the ingenuity that went into devising it, and its feasibility, reasonableness, and relevance as an appraisal technique. At the same time, however, I have questioned its applicability for some situations and have raised some queries on its mechanics. From my knowledge of your Division I know that these comments will receive careful review from yourself and the members of your staff closest to the problem.

It remains to thank those who have been helpful in facilitating my work on this report and expanding my understanding of the special problems of the lumber industry. I am grateful to you for giving me a free hand to plot my own course, to ask whatever questions I wished, to organize the report as I thought best. Discussions clarified many points that an economist would regard as of qualitative interest but whose quantitative importance might be nil, or even irrelevant, so far as a particular industry was concerned. I am also indebted, for information and assistance, to Messrs. A. W. Sump, T. B. Glazebrook, and E. H. Clocker, all of your staff. Mr. Glazebrook contributed substantially to

the study of bid-appraisal experience in Part V. I must also acknowledge the very competent aid in gathering data by Mr. Daniel Cohen of the Division of Forest Economics, and the illumination and encouragement of Dr. Horace Josephson, Director of the Division of Forest Economics. Too, it would be disingenuous if I failed to express my appreciation of the efficient and cooperative secretarial endeavors of Miss Agnes Keane and the staff that assisted her in my several demands for typing services. Mrs. Martha Hensley deserves special mention in this connection.

Responsibility is, of course, mine for the errors that always manage to creep into a work of this size and scope even when done under more favorable conditions of time, deliberateness, and understanding of the special problems of the lumber industry than I have been able to bring to the subject.

Sincerely,

SIDNEY WEINTRAUB

Washington, D. C.
June, 1958

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INTRODUCTION

In the pages below there is some review of the economic aspects of the pricing policies of the Forest Service in appraising for sale the timber stumpage entrusted to its management and care. Following some introductory remarks designed to set the problem in perspective and point up some of the relevant issues, some data on profit margins and profit trends in particular industries, as well as industry in general, has been collected. Besides the obvious importance of this information for comparative analyses, this data ought to prove useful in providing some guides to the situation in the lumber industry where, directly and indirectly, Forest Service (FS) appraisal policy is concerned with profit phenomena and profit outcomes. Some data on profit margins in the lumber industry are also included. Unfortunately, despite efforts to close this gap in our knowledge it was not possible in the time available for this study to obtain more than fragmentary information on the lumber industry.

A statement (Pt. IV) of factors tending to influence stumpage prices, pursuing rather general lines and covering what the economist would know as the theory of price determination, is vital to an understanding of the stumpage price problem; this is included, and largely free of technical language. There is also a short examination of the theory of bidding in view of the fact that Forest Service stumpage market prices involve the principles of an auction market to such a high degree, rather than being analogous to the competitive markets of rarified economic theory where there are presumed to be literally millions of buyers and sellers. All too frequently the presumption is made that because open bidding exists that there is therefore competition in the economist's sense of the term.

This part of the study also contains the results of an investigation into the bidding experience, covering the year 1957, in Regions 5 and 6. Only transactions involving an appraisal of \$20,000 or over were included; the results are quite interesting and illuminating for while only a small fraction of Forest Service sales are thus included, they nevertheless encompass over 30% of the total sales receipts of the Federal agency for the year reviewed. To evaluate the significance of results under sealed rather than oral bidding, the data for transactions in Region 3 were utilized for sales where the appraised value exceeded \$15,000.

The technique of transactions analysis is also expounded and subjected to critical scrutiny (Pt. VI) in view of the apparent importance of these ideas in conditioning Forest Service appraisal policies. This is a subject of continuing study in the Forest Service and hence, some of the possible alternative applications

of these ideas are explored. In principle, it is a useful technique, even an imaginative and ingenious one; it may be, however, that the conditions for its direct application are more stringent than has sometimes been realized.

Some peripheral issues are examined toward the close. One of the chief matters considered in this section is the common allegation that the Forest Service in many geographical sectors constitutes a monopoly in the stumpage market. To anticipate the argument, this charge often does little credit to those who make it. Briefly, the error here is in mistaking the shadow for the substance; on the score of monopoly pricing the Forest Service would hardly be castigated by any responsible and trained economist.

Some conclusions and recommendations appear in the final pages. As some of the inferences may be tempered by a more extended survey, at the present stage they ought to be viewed as tentative conjectures subject to modification, in detail and nuance, if not in essence, after further deliberation.

I. PERSPECTIVES

To place this study in focus and develop certain issues, this section indicates the magnitude and growth of Forest Service timber sales in recent years and, for comparative purposes, contains some overall data representative of the general economy. The trend of stumpage prices is also discussed briefly; prefatory observations are also included on the notion of stumpage prices as involving a "derived-demand."

To demonstrate that contention and disagreement over Forest Service appraisal techniques do not permeate the entire field of Forest Service sales, some break-down of Forest Service sales is also made. The vexing issue of the ultimate purpose of stumpage appraisals is also thrown open for discussion. The entire notion of "fair prices" seems to be distressingly vague until some criteria of "fairness" are developed; a "fair" price hardly reveals itself to the investigator. Briefly, this study develops a functional view of fairness. Critics seem at times to have overlooked these basic questions, with the result that they stand poles apart in their concept of "fairness."

Other topics are alluded to in shorter space. One major question involves the sustained-yield concept as an optimal objective, designed to promote maximum benefit from timber use; this notion would deserve detailed study in itself.

Forest Service Timber Sales and Growth in The Economy

That the Forest Service timber sales and price policies have functioned with apparent effectiveness can be seen from even a hasty examination of the data on sales since 1945. According to Table 1, in both value and volume terms the growth has been little short of spectacular, outstripping most comparable data for the economy as a whole. Undoubtedly, a private enterprise that grew at a corresponding rate would take much pride in its performance, of growing from a moderate size to a reasonably big business. In terms of physical volume, of MBF which corresponds to output or sales units in other enterprises, the growth from 1945 to 1956 approached 120% or an annual rate of almost 10%, vastly in excess of the under-4% shown in the economy at large.

In value terms the expansion of the Forest Service sales activities has been even more impressive--really, almost fantastic. The increase in sales value since 1945 has been of the order of 650% or about 60% per annum. Consider what this would mean if achieved by a private enterprise: any enterprise that moved upwards at this rate would undoubtedly show an accumulation of growing pains which would invite efforts to reconsider its present position, as it became transformed from modest to near

That the growth in value terms has far exceeded that in physical terms is not wholly surprising. Although there is some difficulty in interpreting the value data on aggregate stumpage prices when compared to other prices, for the main part this phenomenon of the value of timber rising at a faster pace than that of final goods in our economy, such as lumber prices, conforms to our knowledge of price facts and inferences from economic analysis. In a period of business cycle upswing and boom, raw material price rises in excess of the rise of prices of finished goods are fairly commonplace.

Volume and Value of Forest Service Timber Sales, and Percentage Changes, Since 1945

Year :	Volume :	Value :	% Increase :
:	MBF :	\$:	Since 1945 :
:	:	:	Volume : Value :
1945 :	3,144,789 :	13,016,232 :	--- : --- :
1946 :	2,729,702 :	11,490,318 :	-13.2 : -11.7 :
1947 :	3,834,588 :	16,399,890 :	21.9 : 26.0 :
1948 :	3,758,885 :	21,054,111 :	19.5 : 61.8 :
1949 :	3,740,810 :	23,749,007 :	19.0 : 120.9 :
1950 :	3,501,937 :	30,714,292 :	11.4 : 136.0 :
1951 :	4,688,280 :	47,816,309 :	49.1 : 267.4 :
1952 :	4,418,530 :	59,341,209 :	40.5 : 355.9 :
1953 :	5,160,355 :	70,616,025 :	64.1 : 442.5 :
1954 :	5,365,113 :	65,407,400 :	70.6 : 402.5 :
1955 :	6,328,229 :	70,760,440 :	101.2 : 443.6 :
1956 :	6,907,043 :	97,619,543 :	119.6 : 650.0 :

- 4 -

price level moved upwards at a pace somewhat below 3% over this time period (about 2.7%). Hence it is abundantly clear that the rise in Forest Service activity, in value and volume, has been substantially greater than in the typical case in the economic system.

Table 2

Gross National Product,
In Billions of Dollars
The Federal Reserve Board Index
Of Production Since 1945

Year	: GNP	: FRB
	: (Billions)	: Prod. Index
		: 1947-49 = 100
1945	: \$ 213.6	: 107
1946	: 209.2	: 90
1947	: 232.2	: 100
1948	: 257.3	: 104
1949	: 257.3	: 97
1950	: 285.1	: 112
1951	: 323.2	: 120
1952	: 345.4	: 124
1953	: 363.2	: 134
1954	: 361.2	: 125
1955	: 391.7	: 139
1956	: 414.7	: 143

Business Failures in Lumber and Lumber Products

As a rough and pragmatic clue to how Forest Service stumpage prices and policies have operated over most of the postwar period, some data on business failures, in numbers and dollar value of outstanding liabilities, is offered in Table 3. Although detail is lacking for any final judgment, the facts contained are worth noticing.

In numbers, failures were at their peak in the lumber and lumber product industry classification in 1956, which happened to be the second highest year in the period under review for the total number of failures. Numerically, the low-years for failures were the immediate postwar years. Thereafter, in the lumber industry and industry in general the trend was upward, with some reversal after 1950. Failures have since continued to ascend. The 1953-54 downswing in business is reflected in the figures, as well as the softening in the lumber market in 1956. In terms of value, the effects of the 1949 and 1953-54 downturn in general business, and the 1956 decline in the lumber market, seem to be reflected rather clearly in the figures.

Numerically, the failures in lumber and lumber products have hovered between 13% and 18% of the total number of failures reported over the period covered, averaging to about 15.5% for the full period. In terms of the value of liabilities involved, the average for the lumber industry has been somewhat smaller, amounting to about 10.7%, with the range being one of 6 to 13%. Either the size of firms in lumber industries is generally smaller than the usual manufacturing and mining average, or small firms fail with greater frequency than the larger in the lumber and lumber products category than over the wider industrial field. Although there is no need to track down the answer to this question at this point, the surmise is that the former condition prevails, that the "typical" lumber product firm is smaller than the general average.

Table 3. Business Failures in Lumber and Lumber Products,
Related to Failures in Mining and Manufacturing

Year	: Number of Failures in Lumber and Lumber Products	: Lumber Failures As A Percent of Total Number of Failures in Mining and Manufacturing	: Current Liabilities of Lumber and Lumber Product Business Failures (\$000)	: Lumber Failures as a Percent of Total Liabilities of Failures
1945	: 49	: 17.5	: \$ 1,754	: 10.2
1946	: 59	: 12.7	: 2,385	: 6.1
1947	: 178	: 13.9	: 14,156	: 9.9
1948	: 267	: 18.0	: 11,903	: 9.1
1949	: 387	: 16.6	: 18,932	: 13.2
1950	: 312	: 15.0	: 11,295	: 11.8
1951	: 220	: 14.3	: 15,262	: 16.8
1952	: 245	: 15.5	: 11,758	: 11.2
1953	: 287	: 15.5	: 14,092	: 8.9
1954	: 336	: 14.7	: 18,584	: 10.8
1955	: 336	: 15.3	: 13,658	: 8.7
1956	: 401	: 17.5	: 22,898	: 12.0
Average	:	:	:	:
1945-	:	:	:	:
1956	: 256	: 15.5	: 13,056	: 10.7

Source: Tabulated and computed from Dun's Statistical Review.

One comment might be made here: although there is no "correct" rate of business failures, according to the statistical evidence the percentage, in terms of numbers, has been fairly stable over both the "good" and "bad" years of this generally satisfactory postwar period (when regarded from a profit standpoint). Likewise,

in terms of losses, as measured by liabilities, the variability (through 1956) is not at any point of an order to suggest that either specific policies of the Forest Service, or any changes in them, were at work.*

Bankruptcy data, without information on the entry of new firms into the lumbering field, on existing capacity relative to sales, and the expansion by existing firms, is notoriously incomplete. Although the data in these respects are sparse and should be supplemented, we can examine some of the available indicators: this is done in the following section.

Evidences of Growth and Decline in the Lumber Industry

Before jumping to the conclusion that the bankruptcy record signifies a general contraction in the size of the lumbering industry it is necessary to examine some of the other relevant

* A broad observation on the matter of business failure and bankruptcy is not amiss. Although bankruptcy is usually a personal calamity (where honest and trustworthy people are involved) it does not necessarily portend a social disaster or economic loss. Often, what simply happens is a scaling down of creditor claims as they become adjusted to the unfolding economic facts; similarly, it also involves as a rule a transference in ownership equity from the bankrupt individual or stockholders to creditors. Frequently, although the firm name may disappear the existing facilities may continue to be used under new ownership or new management: we see this and recognize it as a commonplace when a luncheonette goes out of business and a new one opens, often using the same facilities under a banner proclaiming "under new management." It would be surprising if this did not happen in many cases of the bankruptcies included above.

This implies, then, that if a certain percentage of the firms in lumbering go bankrupt, their facilities and output do not disappear; rather it will often connote simply a change in management auspices and operations. If all bankruptcies were prevented, as some seem at times to suggest, it would mean the perpetuation of both grossly and mildly inefficient managers in the economy alongside the efficient. The bankruptcy wringer constitutes part of our economic process by which ownership and control tend to pass into the hands of the more capable business leaders. This proposition would have to be qualified only in those periods of general and widespread unemployment, when the entire economy is in the doldrums, as in the 1930's. Under the then rampant depression circumstances it could not be alleged that business firms had suddenly become highly inefficient compared to the 1920's. But when activity in a particular industry is high and profits rather pervasive, particular bankruptcies convey personal rather than general social distress.

facts. Though we do not have information on the number of new firms started in lumbering, as an offset to those failing and leaving, there are other data that shed some light on this matter.

For example, if we look at the figures on value added in lumber and lumber products, all of which would ultimately indicate the growth of the industry, and compare it to the total for all industries the results appear as follows:

Value Added by Manufacture, 1949-1954 (billions of dollars)

<u>Value Added:</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>
All Industries	\$75.4	\$89.7	\$102.1	\$109.2	\$121.6	\$116.0
Lumber and Products (except furniture)	2.3	3.2	3.5	3.4	3.5	3.2

Annual Growth Rates: 1949-50 1950-51 1951-52 1952-53 1953-54

All Industries	\$19.1	\$13.7	\$6.9	\$11.4	\$-4.6
Lumber and Products	38.6	11.3	-2.2	1.5	-9.2

1949-1954 Growth Rate:

All Industries	53.9
Lumber and Products	39.1

Source: Bureau of the Census, Annual Survey of Manufactures.

On the whole, from the growth standpoint, the lumber and lumber products sector has not fared too badly relative to the general average in the period for which the data are available. For the first part of the six-year period its rate of advance exceeded the general average, with a manifest slow-down in the second half of the period.

Examining some data on capital outlays, as a clue to previous estimates of profits in the industry--as an evidence in a sense, of the general confidence in the future as exhibited by businessmen--the results are not wholly unfavorable for the lumber industry. The figures in Table 4 show continuous outlays for plant and equipment in all segments of the lumber industry. Comparing 1955 with 1951, lumber and lumber products show an increase in capital outlays of some 25%, while Lumber and Timber (basic products) show an expansion of 22%. For all industries the 1951-55 rise is only 9%. Over the period covered by the data, the lumber industry thus exhibited a faster pace of capital expansion, apparently reflecting the confidence of firms in the future outlook and a willingness to invest. These data hardly support the gloomier conclusions that might be drawn from the bankruptcy statistics alone, covering the same period.

Table 4. Manufacturers' Expenditures for New Plant and New Equipment for Establishments in Operation, Lumber and Products Compared with All Industries Expenditures, 1951-1955.

(millions of dollars)

Industry	1951	1952	1953	1954	1955
All Industries	7,205	7,596	7,542	7,818	7,855
Lumber and Products (except furniture)	240	178	183	217	302
Logging and Logging Contractors	n. a.	34	37	49	n. a.
Lumber and Timber Basic Products	140	106	95	120	171
Millwork and Related Products	30	21	30	29	44
Wooden Containers	n. a.	6	10	8	9
Miscellaneous Wood Products	12	10	11	12	n. a.

n. a. = not available.

Source: Bureau of the Census, Annual Survey of Manufactures.

It is also illuminating to look at the salary and wage bill in lumber and lumber products and compare this, as well as the employment figures, to the results in all manufacturing industry.

Wages and Salaries, and Employment, in All Manufacturing Industries and in Lumber and Lumber Products (excluding furniture)

	Wages and Salaries (billions of dollars)				Ratio 1954/1951
	1951	1952	1953	1954	
All Industries	\$ 56.0	\$ 61.1	\$ 68.6	\$ 66.0	117.8
Lumber and Products	2.0	2.1	2.1	1.9	96.3
Average Number of Employees (000 omitted)					
All Industries	15,613	16,061	17,093	16,135	103.4
Lumber and Products	770	742	720	649	34.3

Source: Bureau of the Census, Annual Survey of Manufactures.

So far, this table, more than the others, indicates some gathering hardships in the lumber field. Not only was there an employment drop over the period of some 16%, compared to a general advance of some 3%, but the wage and salary bill fell off by almost 4% while a nearly 18% advance was registered in the economy.

Statistics available at the time of writing, on net earnings as a percent of capital invested cover a slightly earlier period; they are not without interest in rounding out the picture. These appear as follows:

Net Earnings as a Percent of Capital Invested, 1948-1952

	<u>1948</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>
All Corporate Manufacturing	9.87%	7.36%	9.81%	6.74%	5.08%
Lumber and Wood Products	12.95%	6.01%	12.64%	8.74%	5.93%

Source: Economic Almanac, National Industrial Conference Board, 1956, p. 297.

While the data in this table encompass a slightly earlier time span they nevertheless testify to a more favorable situation in lumbering and related products than in the broad manufacturing sector; if nothing else, the facts reveal at least some partial recompense in the earlier postwar interval for the less satisfactory results that might be shown in later years if the data were available.

As to absolute earnings, the following figures throw some light on the development:

Net Earnings, Corporate Manufacturing and Lumber and Wood Products, 1948-1952 (millions of dollars)

	<u>1948</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>Ratio 1952/1948</u>
All Corporate Manufacturing	\$10,222	\$7,637	\$11,538	\$9,153	\$7,372	72.1
Lumber and Wood Products	330	152	380	286	197	59.7

Source: Economic Almanac (1956), p. 296.

Dollarwise, earnings in the inclusive manufacturing sphere were better maintained than earnings in the lumbering field attesting in the main to the greater pace of capital investment and sales expansion in other fields as compared to lumbering over this period. This is borne out by the following data on capital invested:

Capital Invested, Corporate Manufacturing 1948-1952
(billions of dollars)

	1948	1949	1950	1951	1952	Ratio 1952/1948
Total Corporate Manufacturing	\$103.5	\$103.8	\$117.6	\$135.7	\$145.0	140.0
Lumber and Wood Products	2.5	2.5	3.0	3.3	3.3	130.3

Source: Economic Almanac.

Thus, as investment in the lumber and wood products industry failed to keep the general investment pace the fact that earnings did not grow as rapidly as over the broader field becomes somewhat more intelligible. This general tendency is also indicated by asset data which cover a slightly later time span:

Total Assets, Manufacturing Corporations, End of Year Estimates
1951-1954 (billions of dollars)

	1951	1952	1953	1954	Ratio: 1954/1951
All Manufacturing	\$158.1	\$166.0	\$171.0	\$175.1	110.7
Lumber and Wood Products	3.6	3.5	3.3	3.3	92.7

Source: Economic Almanac (1956) pp. 287-292.

A continuous asset decline in the lumber and wood products group, compared to the general manufacturing trend, is indicated in these few figures. This development bears watching and deserves more extended study.

Examining some data on capital invested per production worker in the respective manufacturing sectors:

Capital Invested Per Production Worker, All Manufacturing
Industries, 1948-1952 (in dollars)

	1948	1949	1950	1951	1952	Ratio 1951/1948
All Manufacturing	\$8,815	\$9,718	\$10,423	\$11,212	\$11,980	135.9
Lumber and Wood Products	4,241	4,680	5,147	5,270	5,688	134.1

Source: Economic Almanac (1956), p. 298.

According to these figures, the capital invested per production worker in lumber and wood products held the pace of industry in general; hence, the fall-off in earnings and in total capital invested is associated with an employment fall-off in the industry. This is disclosed by the following figures:

Employment of Production and Related Workers in Lumber and Wood Products Industries, 1947-1956 (thousands of workers)

1947	781	1952	719
1948	755	1953	698
1949	678	1954	637
1950	743	1955	679
1951	769	1956	672

Source: Bureau of Labor Statistics.

A fall-off in production workers from 1948 to 1952, from 755,000 to 719,000, a drop of nearly 5%, appears in these figures. A continuing decline since 1952 is also shown, with the 1956 total of 672,000 being some 83,000 below the 1948 figure, amounting to some 89% of the 1948 figure.

Some Economic Indicators: Washington and Oregon

Some index to economic conditions in that important segment of the lumber industry located in the States of Washington and Oregon may be garnered from the following data; the figures are also useful for they are of more recent date than the data just examined.

Table 5. Employment, Unemployment, and Lumber Production
Washington and Oregon

Manufacturing Employment:		Unemployment:		Lumber Production Western Washington and Western Oregon Million BF
(000)		(000)		
Oregon	:	Washington:	Washington	
	:	:	:	
1948: 137.4	:	174.4	: 50.8	: 9,405
1949: 125.3	:	170.6	: 69.9	: 9,870
1950: 135.5	:	175.5	: 59.6	: 10,664
1951: 147.6	:	190.3	: 32.2	: 10,416
1952: 141.2	:	192.1	: 37.7	: 10,154
1953: 143.2	:	195.4	: 43.8	: 9,745
1954: 135.9	:	189.9	: 60.2	: 8,852
1955: 143.3	:	202.3	: 51.8	: 9,611
1956: 147.1	:	207.4	: 47.7	: 9,140
1957: 138.0*	:	224.0*	: 50.0*	: 8,400*

Source: Pacific Northwest Business (University of Washington, January 1958, pp. 18-23).

* Estimated on the basis of 11 month data.

According to Table 5, lumber production in the western Washington-western Oregon area has fallen very sharply since 1950, providing a ready explanation of the chronic complaints of a region faced with declining production since the beginning of this decade. The fall in manufacturing employment since 1956 is clear for Oregon; Washington has, on the other hand, shown almost a 10% rise though unemployment has simultaneously increased.

Stumpage Prices and Wholesale Prices

Turning now to stumpage price phenomena (see Chart 1), it is evident that the movements in stumpage prices since 1949 have vastly exceeded the course run by other indexes. Neither lumber, structural steel, cement, clay products, nor the inclusive all-commodity index, have moved at anything like the speed shown by the stumpage price index. While we need not dwell very long on the comparisons with the 1920's, or even the early 1930's, for the postwar period the discrepancies are rather remarkable. Part of this fast uplift in stumpage prices can be explained by the fact that stumpage is a raw material and hence, likely to move faster on an upswing than finished products. However, it is a fact that the stumpage price index is of a somewhat different nature than the usual price index; we shall elaborate on this in a moment.

That wholesale prices are more sensitive and move over a greater range than retail prices has long been remarked. Likewise, that farm prices move over a greater range than processed foods has been commented upon and observed frequently. Thus it is not surprising that stumpage prices, for similar reasons, should be more sensitive and move over a wider amplitude than lumber prices. It might be contended, however, that the discrepancy surpasses the range that can be accounted for by the usual reasons.

The reason that the stumpage price "index," as depicted in the chart, must be used with more than the usual caution is this. Normally, where used it is derived by tabulating Forest Service sales receipts and then dividing by the volume of board feet sold in order to derive an average in dollars per MBF. This is then converted to index number form. Examined through a statistician's eyes this creates a crude index form inasmuch as the series contains changing physical weights compared to the usual price index which is built out of a series of quantities of constant amount. Thus a shift in Forest Service sales to more valuable timber species is capable of enlarging the rise in the derived index number.*

* It is perhaps for this reason that the Forest Service has never officially sanctioned the type of series commonly used. Even more refined series which confine stumpage price indexes to the same species suffer, though to a lesser extent, from the same defect

Stumpage Prices and Derived Demand

That raw material prices should fluctuate through a greater price range than final goods stems from the central fact that the demand for them is a derived demand, i.e., derived from the demand for the final product in which they contribute. Thus price changes in the latter, through a demand uplift or fall, will be reflected in the prices of the necessary productive factors which are the ingredients or inputs required in processing the final products. Considering any single input, if the prices of other associated productive factors are relatively rigid because of their use over a wider industrial field, all of the burden of price adjustment will be thrown upon that factor whose use is limited largely to one product and hence, becomes vulnerable to all of the immediate influences operating on the final product. This can be made more apparent by a simple illustration.

Suppose, for illustration, that the price of lumber is \$100 per MBF. Also, suppose that the cost of logging and milling, including some normal profit allowance, is \$30 per MBF. In this case then, the margin for stumpage is \$20 per MBF. Suppose now that there is a decline in the price of lumber, perhaps due to some curtailment in building so that to sell the same amount of lumber as before the price must slump to \$90 per MBF. Also, because of wage scales and the job opportunities elsewhere, labor costs (and other milling costs as well) do not fall, so that these stay at \$30 per MBF. The price of stumpage must then tumble to a figure of \$10 per MBF. Hence, in this case, whereas lumber prices have moved down by \$10 or 10 percent the price of stumpage will likewise fall by \$10 per MBF but implying a movement of 100 percent.*

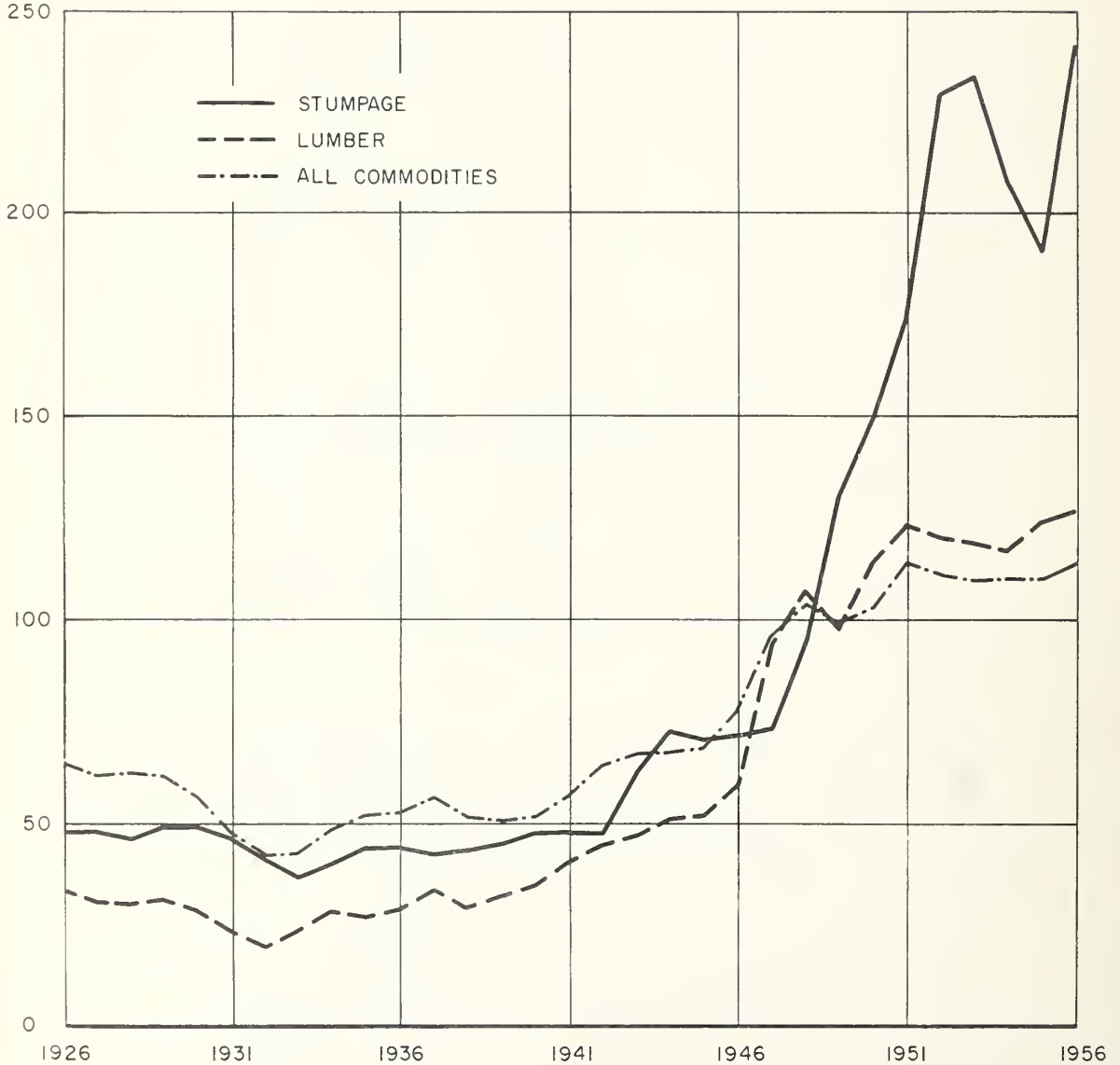
in view of varying log qualities. From fragmentary data for 1954-1956 there does appear to have been some change in the composition of species sold in at least Regions 5 and 6. The whole question might be referred to a statistician for a survey of the possibilities of deriving a valid index. A recommendation to this effect is made below.

* Thus if $\Delta P_X / P_X$ represents the relative change in final product price per MBF and $\Delta P_S / P_S$ is the relative change in stumpage price, the ratio of proportionate change is: $\frac{P_X \Delta P_S}{P_S \Delta P_X}$. Hence, where $\Delta P_S = \Delta P_X$, then the ratio of relative price changes will be equal to the ratio of product to stumpage price.

Chart 1

INDEX OF AVERAGE PRICES FOR STUMPAGE COMPARED WITH BLS WHOLESALE PRICE INDEXES OF LUMBER AND OF ALL COMMODITIES. (1947-49 = 100)

INDEX NUMBER



The illustration can be reversed for the case of an upswing in the lumber demand. Although we have assumed an utter rigidity in logging and milling costs, the conclusion would not be upset in essentials if we allowed for some plasticity in these elements, so long as their absolute fall was exceeded by the price change in lumber. The phenomenon of derived demand, and the limitation of uses for stumpage as compared to the other productive factors involved in logging and milling, would explain much of the extreme sensitivity of stumpage prices to lumber prices.

Illustrations of the principle of derived demand, where the price of an input is a reflection of the price of an output, are not hard to find. For example, Chart 2 (from Farm-Retail Spreads for Food Products, United States Department of Agriculture, Agricultural Marketing Service, Miscellaneous Publication No. 741, November 1957) shows the farm-retail spread for meat products from 1947 through 1956. Patently, the interesting fact here is the high degree of correspondence in the movement of farm prices and final product prices. Similarly, from the same source, egg prices at the farm to prices at retail are illustrative of the same phenomenon. Also, in Chart 4 there is the very close relation between the price of flour at the baker's level to the price of wheat at the farm; the constant rise at the retail level for bread reflects rising distributive costs at the later stages in the distributive chain. Much the same relationship is indicated in the case of fats and oils and in the retail price and farm value of beef. (See Agricultural Marketing Service, Miscellaneous Publication No. 710.)

Cases of Contention in Appraisals

To return to more substantive matters in this explanatory survey of Forest Service stumpage price-appraisals, it can be argued with some validity that almost regardless of the method the Forest Service uses in making appraisals, however judgment is mixed with data, the pricing consequences may not be vastly different in the broad majority of cases. For example, of the 27,342 sales made in the fiscal year 1955, by the Forest Service, a total of 26,686 were valued at \$20,000 or less. (See Table 26). In the majority of these cases, whatever appraisal technique is used, much discretion will have to be left to local officials in touch with the immediate details and always conscious of forestry objectives as well as price receipts. While appraisal practice in some cases may affect the results, so long as competitive bidding can be stimulated in the smaller transactions the Government's interest will ordinarily be adequately protected.

Of the remaining 656 sales in the fiscal year 1955, 463 were made in the \$20,000 to \$100,000 range and 193 fell in the over-\$100,000 grouping. Most of these larger sales appeared in Region 6, with 136 sales in the \$20,000 - \$100,000 class and

Chart 2

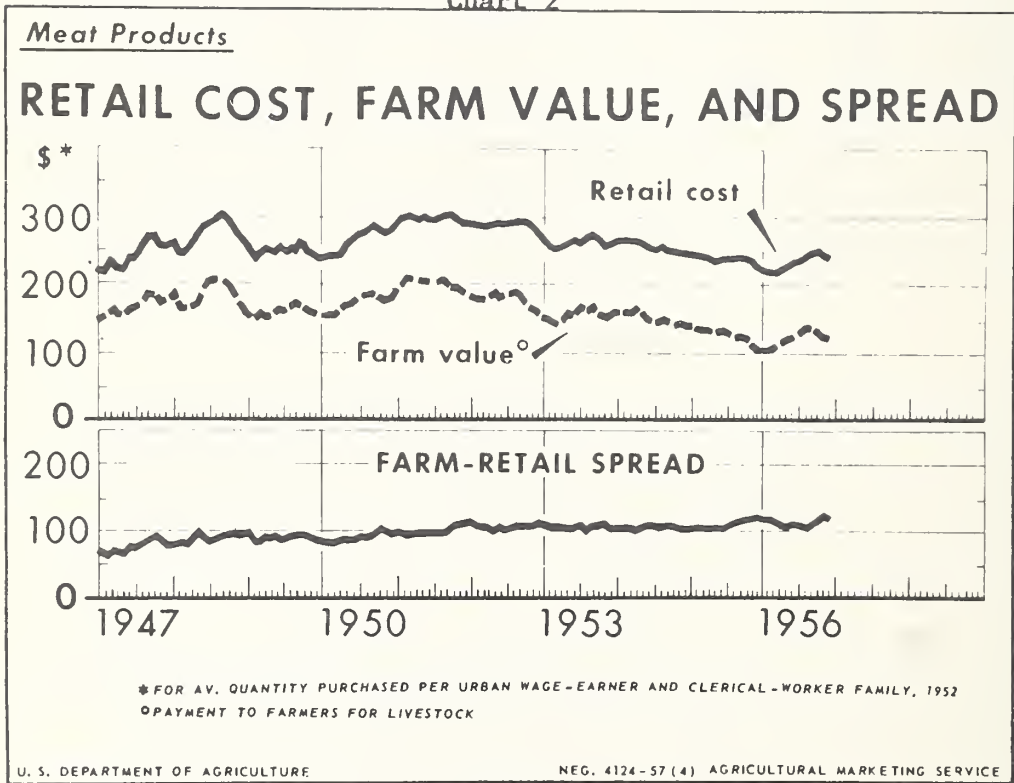


FIGURE 11

Chart 3

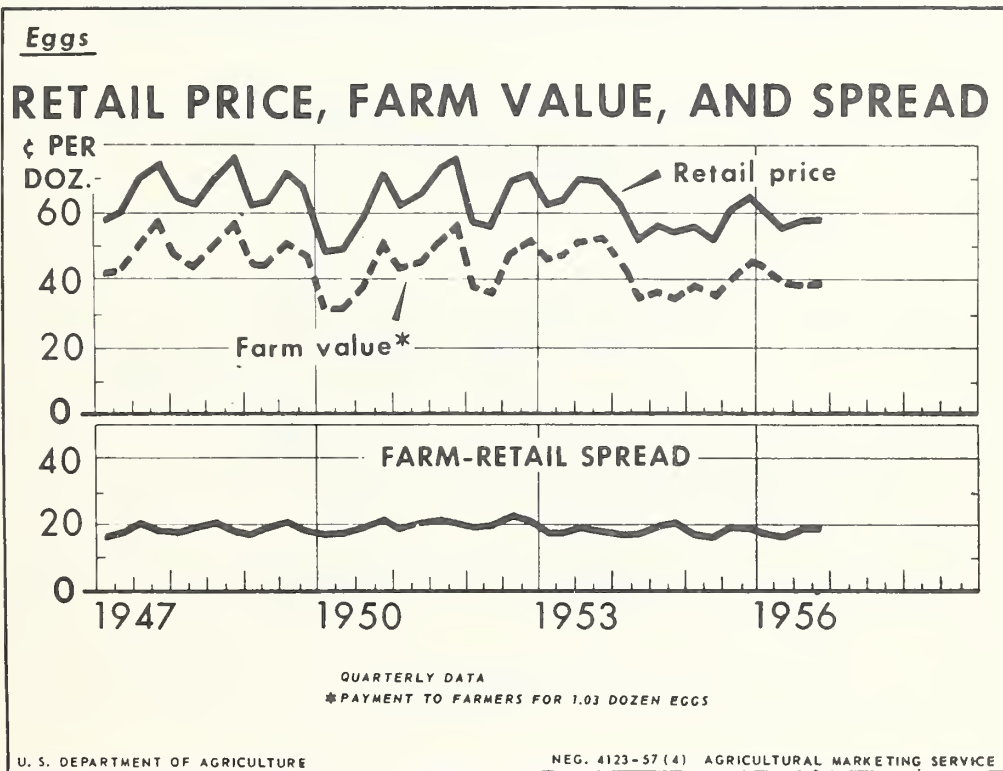


FIGURE 17

Chart 4

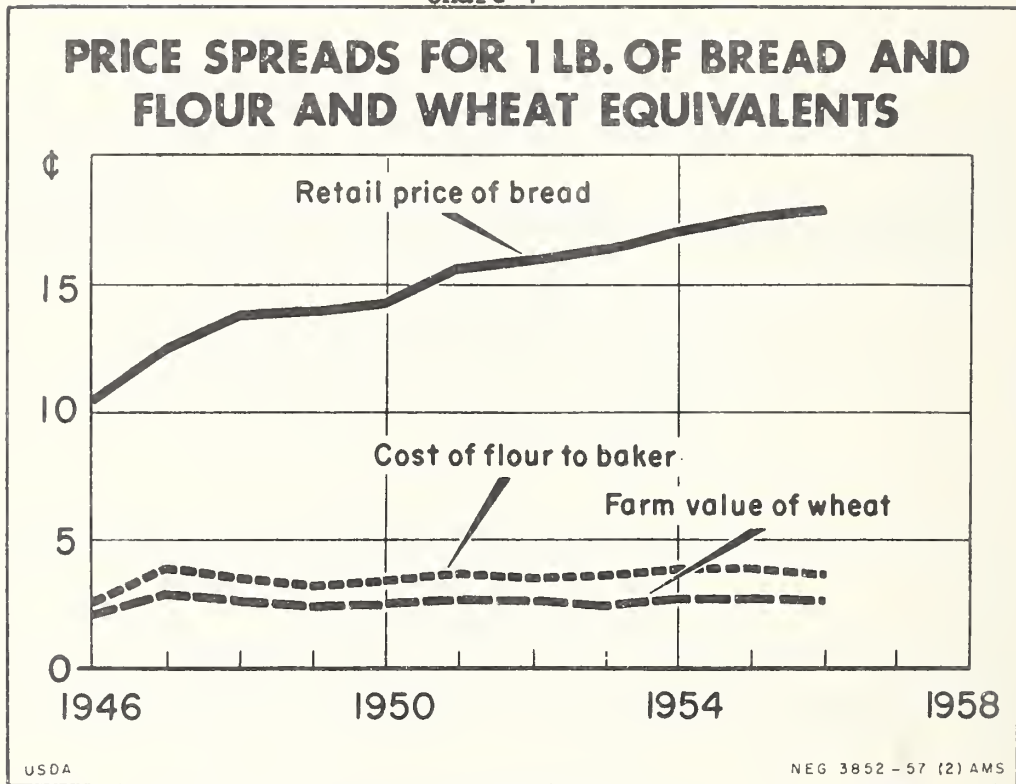
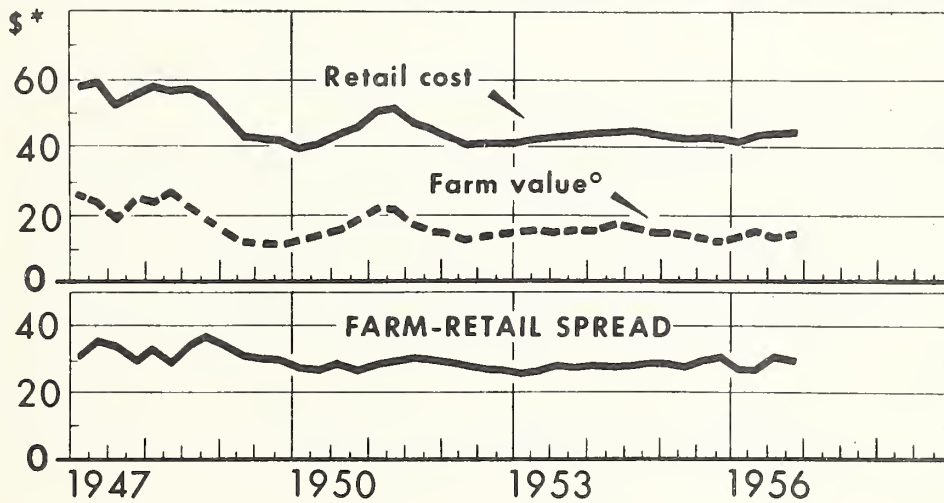


FIGURE 20

Chart 5

Fats and Oils

RETAIL COST, FARM VALUE, AND SPREAD



QUARTERLY DATA

* FOR AV. QUANTITY PURCHASED PER URBAN WAGE-EARNER AND CLERICAL-WORKER FAMILY, 1952

° PAYMENT TO FARMERS FOR INPUT VALUE OF COTTONSEED OIL, SOYBEAN OIL, AND LARD, AND FOR PEANUTS.

U. S. DEPARTMENT OF AGRICULTURE

NEG. 4122-57 (4) AGRICULTURAL MARKETING SERVICE

FIGURE 27

110 in the over \$100,000 category. Region 5 had 43 and 41 sales in these respective groups. Region 8 listed 151 sales in the \$20,000 and up category and 12 sales of over \$100,000. In the other regions the number of large sales was considerably less significant. According to the evidence developed, these sales of \$20,000 or over in Regions 5 and 6, totaled some \$31.6 millions out of about \$70 millions of transactions for the Forest Service. Of the \$31.6 millions of larger sales, about \$15.2 millions occurred in conditions in which there was only a single bidder for Government timber and so, sold (with insignificant exceptions) at the appraised price. Thus, in the larger transactions (over \$20,000), amounting to some 44% of all Forest Service receipts about 22% of the full total (in value) was disposed of at appraised prices, at least in the two regions specified. It is on these transactions that the Government Accounting Office has often appeared to argue that pricing has been too low while, with corresponding vigor, industrial spokesmen hold that the appraisals have been too high. With this background to provide some sense of proportion we can consider some of the charges and complaints, to set up some of the issues for further study.

Some Criticisms of the Forest Service

In the first place, the Government Accounting Office has appeared to criticize Forest Service appraisals as being too low, on the ground that where there were two or more bidders, the actual sales price often exceeded the appraised price by as much as 50% or more.* Yet when one reflects on this argument, without better evidence it is really no argument at all. Nobody has really doubted that when there is active competition with many persons anxious to possess a piece of property the sales price will be higher, relative to the minimum sum that the seller would be willing to take, than when competition in this sense is smaller. Anybody fortunate enough to be able to offer a house for sale in the seller's market just after the war, as compared to currently say, can attest to this. The relevant question is not the comparison with other sales but whether, on the particular stand offering, and roughly within the period that the Forest Service wanted to sell, whether any buyer would have been willing to pay more. In some cases this is doubtful. Too, in making the comparisons with other multi-bid sales, in stressing the sale price-appraisal ratio the relevant issue is whether the timber offerings were strictly comparable. It is always essential to make sure that the "product," in this case stumpage, is precisely the same, or nearly so, in all relevant

* See the Report on Audit, Region 6, Portland, Oregon (1955-1956), p. 4 and Report on Audit, Region 5, San Francisco, California (1955-1956), p. 2.

dimensions before alleging that one "package" is being under-priced relatively to another. It is not apparent that the Government Accounting Office reports are well documented in this respect or on the matter of whether the appraisals have been made on the same basis.

Further, there is this vital question that must be resolved by the Government Accounting Office: what does it propose to do when the appraisal price represents the maximum that the only apparent buyer will pay? Would it propose to withdraw the transaction on the ground that the proceeds are too low? This issue must be faced because if stumpage prices are to be lifted when lumber markets are weak and buyers are choosy, then some sales offerings at high appraisals will be rejected by buyers. The Forest Service could then be very well subject to the criticism of not fulfilling its declared objective of selling sufficient timber to achieve a sustained yield harvest.

One further point: appraisals are a device to eliminate bidders. If appraisals are arbitrarily raised higher so that several bidders drop by the wayside without even entering a formal bid price, and thereafter sales are made at or about the appraisal figure, would the Forest Service not be vulnerable to the complaint that is now meted out to it, namely, that its appraisals are too low, that buyers are acquiring timber at the appraised price, and that there is "no" competition? Thus the argument that the Government Accounting Office has used could cut both ways, that in the one-bid situation, rather than sales at appraisal being conclusive evidence of the failure of the Forest Service to receive an adequate price, it might be taken as presumptive evidence of its receipt of maximum prices. When appraisal approaches more and more closely to the limit of the highest possible bidder, the effect is to suppress other bids, giving evidence either of a lack of over-bids or of an appraisal which came closest to predicting the ultimate price.

Industry spokesmen have generally alleged that the appraisals are too high. One contention has been that appraisals have shut out bidders, which is hardly a criticism at all for this is the purpose of all prices--and appraisals. It has been argued that at the stumpage prices prevailing it is impossible to earn profits in the industry, pointing to the rate of business failures to support their argument. This last point is often irrelevant. With declining lumber demand, failures were almost inevitable in an industry where there are many small firms able to start up quickly, prompted by high levels of demand for lumber. That it is "impossible" to earn profits is a generalization which seldom applies to the whole industry. Further, industry spokesmen often contend that the mere fact of appraisal tends to encourage "overbidding." This is hardly news, despite erroneous inferences drawn from it. Unless the Government is to

sell timber regardless of the size of the bid, even if a penny were offered for a stand of timber, an appraisal is necessary. Further, industry spokesmen have argued that the appraisal technique of transactions analysis, leads only to decreasing profit margins. This is a legitimate issue, which will be considered at some length below.*

There is also the frequent allegation that the Forest Service is a monopolist, in at least certain areas. We shall analyze this at length later on; suffice to say now that when there is only one seller monopoly in this sense cannot be avoided any more than the fact of the sun, wind, or rain. Yet the significant question is not whether there is but one seller, but how this seller acts. For example, in the public utility field, there is only one "seller" of the product. But if its behavior is such as to make services available in a manner comparable to competitive practices, there can hardly be any warranted criticism. Thus it does not help to shout monopoly; criticisms of pricing modes are almost inevitable and there is no reason to desire that they cease so long as they focus on legitimate issues. However, ill-founded criticism scarcely advances a solution; and this is the nature of the "monopoly" allegation. The proper arena for discussion among perceptive men is in the validity of appraisal levels and appraisal techniques. Opinions may well differ on these matters.

Functional Price Versus Fair Price: The Objectives of Forest Service Appraisals

Part of the problem of the appropriateness of the appraisal and the resulting criticism is due to the nebulous nature of the concept of "fair value" often used in these discussions. Unfortunately, this is one of the vaguest of terms and explains why economic analysis has generally dropped it, despite its almost intuitive appeal. What is fair to one must, whenever there is a difference in opinion, be unfair to the other. The buyer intent on paying a low price will regard almost anything above zero as "unfair," while the seller will regard anything less than an infinite sum as unfair. While these extremes are widely drawn for illustrative purpose, they do indicate that so long as the purposes of buyer and seller differ, then judgments of the fairness of a price are bound to differ. Small wonder then at the cross-fire criticism directed at the Forest Service. To manage an economic system, to dispense economic justice with equity and equanimity, would be an easy matter if the concept of economic "fairness" were crystal-clear and beyond

* See Part VI.

dispute. It is largely because of the futility of determining "fair" prices that in our system price formation has been left to be adjudicated in the market place. After all, this is the basis of a market enterprise economy compared to a feudal status system of "fair" and "just" prices.

All this seems to be conveniently forgotten in the welter of discussions of the "fairness" of the Forest Service pricing procedures. Does anyone really contend that prices, say, in the public utility field are "fair"? Or is it that the adjudication conforms to law and represents some compromise between conflicting views? Is a compromise "fair"? This subject ought to be left to the philosophers. Are farm prices "fair"? A city dweller has one view, a farmer another. Are wage rates "fair"? Are industrial prices "fair"? Merely to raise these questions provides the answer. What do we expect of prices? Economists are quick to point out that prices serve a functional use, to get goods produced and distributed, to organize productive resources for the production of goods, and to provide income to the owners of the productive agents. So long as prices are reflecting the pulls and tugs of demand and the incidence of costs, then the economic system is working effectively. When prices are failing to register changing demand and cost situations, so that the prices are literally suspended and not giving the signals on the nature of underlying changes, then they are failing to fulfill their function with the result that in those sectors of the economy the adaptation of resources to desires is not being accomplished.

On this premise, let us consider what we expect of prices on Government timber. If the primary objective of forestry policy is to move a given volume of timber onto the market in a given period of time, insofar as this is being done at the prices named then the price policy, judged by this criterion, is operative and effective. This must be the first test of the stumpage price arbitrament: can it accomplish the forestry objectives, getting the timber cut in accordance with the principles of sustained yield, and providing the basic raw materials for the various wood products wanted by our population? By and large, a pricing policy that is not moving the timber would have to be adjudged a partial or complete failure.

But this is not the sole test of an effective pricing policy. For example, I might sell shoes, say one hundred pairs, at a price of \$10 or less. Thus there is a complete range of values, at \$10 or below, which can accomplish the objective. What price ought to be established here? Below \$10, buyers will reap the greater gains while the seller would secure the income advantage as price approached more closely to \$10.

In a product which is an essential industrial material, as is stumpage, this is in part a problem of the magnitudes that will ultimately appear as the profits of the operators. On

this score the important principle seems to be that the sums left as profits must be large enough to render the industry strong and healthy, in the sense of being able over time to process the volume of stumpage that the Forest Service estimates will accomplish the long-range forestry program.

It is at this stage that we are plunged deeply into the realm of conjecture. What level of profits will keep the industry at appropriate size, providing for growth over time? There is no real way of knowing the answer to this riddle in advance, almost no test other than a pragmatic one. For example, if profits are low in any one year, so long as future prospects look sufficiently bright then the temporary results are less important than the portended outcome as visualized by the businessmen. If prospects are poor, then the combination of a low sum of profits currently and bleak outlook for the future are likely to hasten the departure of firms from the field. To compound the difficulties, businessmen are often not clear in their own minds as to the level of profits they require as adequate--and neither are their public statements always calculated to help matters. For example, even in the boom post-war years many were averring that their profits were inadequate even though they were undertaking expansion plans in the light of them and were perfectly able to subsist under the earnings forthcoming. Much of the problem hinges on such complex matters as the level of employment and output, the nature of fixed costs, the availability of funds for financing, government tax policy, etc.; all of these elements represent relevant facets of the final business investment decision but each simultaneously involves matters over which the Forest Service exerts neither control nor even a significant influence.

Too, while a governmental policy of pricing designed to maintain an industry at a definite size seems to be a clear-cut prescription in military procurement problems, where the flow of orders is entirely dependent on military demand and where the cost of plant and equipment is high and expensive, the same approach does not apply to the lumbering industry where alternative sources of timber are available and where small firms are capable of springing up almost overnight in response to very short-run profit prospects. Thus the sums of profits required to sustain large existing firms need not conform to the sums necessary to attract smaller operators whose earning demands may be smaller and whose time horizon is more limited.

Thus we are left with at least two principles which, whatever the vexation occasioned in their implementation, must nevertheless serve as the guide to any timber pricing program. These are: (1) The prices must be low enough so that the annual sustained cut is actually harvested. Any failure to capture this harvest means that the basic technical program is not being fulfilled. (2) Then, is the current crop being harvested and the industry left in such a condition as to be

able to survive as purchasers of the successive future harvests? If the answer to either of these questions is in the negative, a reconsideration of price policy would be called for. It may happen that to attain the first objective alone a higher stumpage price can be named than would be justified by the second principle.

Conversely, where the current timber reserves are being harvested, but profits are leading to a growth in capacity in excess of estimated future requirements, it would seem that price could be increased. Of course, any attempt to implement a policy of rising stumpage prices is always likely to encounter objections. Nonetheless, only by attempting to meet both rules, of moving the annual harvest and gauging capacity growth with presumed needs, is the Forest Service--or the market, in the absence of any appraisal technique--likely to accomplish the necessary functions of pricing in an essentially enterprise economy. An overexpanded industry, for example, will have to contract by one means or another.

The Sustained Yield As An Optimal Concept

This analysis will make no attempt to judge whether the concept of placing out a given cut of timber each year for harvest in accordance with the principle of sustained yield is an optimal one, in the sense of being best designed for the long-run well-being of our people and economy. Instead, we shall proceed on the assumption that this is so, that the sustained yield program represents the best thinking on the subject. For if this objective is not to be maintained, we are devoid of any definite goal to be accomplished through stumpage price policy. There would be as many possible prices as there were stumpage offerings to be moved: we can talk sense about what prices we want to institute only if we know what output goals are to be met. If we wish to run down our forest preserves, lower prices would commend themselves. Conversely, if we want to build up the holdings, permitting practically no cutting, this can always be accomplished through exorbitant stumpage prices. In the same way, if car manufacturers want to move 100,000 Cadillacs of a given styling per annum price can be higher than if they are intent on selling 400,000 of these automobiles.*

* While we thus take the amount of timber to be offered as a datum, determined by the conservation and forestry policy of the Forest Service, it might be remarked in passing that this entire subject might lend itself to renewed study in order to ascertain whether a modification of this principle is indicated. Modern economic analysis might conceivably indicate that another principle may be an even more significant one.

Surrounding Conditions of Sale

Other than price, in order to sell effectively a seller must not so circumscribe the conditions of sale as to hamper and discourage purchasers or thus, to induce them to buy only at substantially lower prices. Economists would thus stress, apart from price, the surrounding conditions of sale. When these are onerous or otherwise unsatisfactory to buyers, it is as if a too-high price is being charged: hence the merchandise can only be moved if the price is reduced.

To take an everyday illustration, if cigarettes are sold at the same price in all shops we will tend to buy them in the store most convenient, where the owner is pleasant, and friendly, the shop clean etc. Suppose the personality of the seller is more repelling, or that his location is less convenient--amounting to less satisfactory surrounding conditions of sale. We are likely then to make purchases in this shop only if the price is substantially lower than that charged by other more convenient or more congenial sellers.

Something of the same principle applies to the Forest Service in its business dealings with loggers. Insofar as the contractual terms of government timber are believed to be more burdensome than on private timber holdings, then the Forest Service will have to settle for lower stumpage prices: this fact alone invalidates any simple comparisons of stumpage prices of private timber and Forest Service timber for, because of these very differences in contract terms, the "commodities" are not strictly comparable.

Although the writer is not competent to evaluate the technical features of Forest Service contracts, particularly those aspects regarded as essential from the standpoint of long-run forestry policy, these must inevitably have some influence on stumpage prices. At a minimum this suggests that industry complaints must be listened to--as they are listened to and reviewed constantly--in order to determine whether some features might not be altered to facilitate logging operations without compromising desirable forestry ends. More satisfactory contract provisions can thus have the same sales impact as lower stumpage prices, in direction if not in degree.*

* One observation may be ventured here. Industry spokesmen have expressed some displeasure at the short-run duration of the contracts, arguing in some cases for a five-year cut arrangement. In certain conditions this would seem to be justified. For example, a firm fully dependent on government timber as its essential raw material could hardly be expected to make long-range plans, involving the purchase of heavy

In the discussion of a functional price it is nonetheless assumed that despite the appraisal, in order to forestall any charges of favoritism the offerings will actually be made available through competitive sale. Because of a difference in private valuations of profit opportunities as compared with Forest Service estimates, there will probably be active bidding on most of the Forest Service offerings, with the timber stand going to the highest bidder. This outcome is unavoidable barring arbitrary intervention of the Forest Service in the timber economy, involving allocations of the timber; this undoubtedly would be unpalatable to both industry and the Forest Service, incompatible as it is with the ordinary functioning of our economy. Nothing said hitherto, on a functional price, should be interpreted as suggesting the abandonment of the democratic rule least subject to recrimination, namely, of sale to the highest bidder.

In most cases, therefore, adherence to the rules for a functional price will lead to the appraisal price becoming the purchase price only where the transaction represents in effect a negotiated sale, due to the presence of just one possible purchaser, or where only one purchaser seems interested enough to bid for it. Yet the pursuance of a sale to the highest bidder is not without at least one problem of its own. We refer to the case of cutthroat competition where the bidding objective seems at times to be motivated by the thought of securing a timber stand in order to deny its use to another firm, thereby forcing the latter firm out of the industry.

If this practice is at all extensive and continuous, the upshot must be to reduce future competition and limit the number of purchasers of Forest Service timber. Followed to its extreme conclusion, the ultimate consequence would be that as the numbers demanding Forest Service timber contracted, the price of stumpage could be bid down by refusals to purchase at appraisals, amid protests that the latter were too high. Conceivably, the Forest Service might find nominal prices as its lot: in a real sense the Forest Service would then be at the mercy of the remaining buyers.

equipment, unless it could look ahead for from five to ten years. Hence, it is difficult to be unsympathetic to protests that there is no assurance given to such operators that timber will be available. This need not be interpreted to suggest longer contracts as a general rule; it does imply, however, that such contracts have their place in the full sales scheme which must be tailored in measure to the demands of the market.

Nobody is suggesting that this is imminent, either in the near or even the remote future. However, it does indicate an unwholesome aspect to the practice of allotting the timber stand to the highest bidder. In a fuller analysis it might be demonstrated that where the high bid is a result solely of financial strength (or some peculiar quirks of our tax laws) there is nothing particularly desirable in making the timber stand available to the high bidder. Policy in such cases raises some fundamental issues that the Forest Service ought to seek to resolve. One suggestion might be that whenever cutthroat competition seems to rear itself, regional foresters might be instructed to make additional timber available for sale and hasten cutting so that, through the sheer weight of the offerings, the "overbidders" would desist and timber would be available on a fuller scale for all legitimate competitors.

Competitive Bidding and Small Business

Analogous questions arise in complaints by small operators to the effect that large firms bid for the smaller timber tracts, paying a higher price and forcing them out of business. This raises the question of the extent to which all Forest Service offerings are to be truly open to all bidders, or whether efforts ought to be made to protect small firms by prohibiting bids on certain smaller tracts from large firms. Undoubtedly this is a chronic problem; policy decisions at the highest levels must be made on this matter to avoid the contradiction of special legislation assisting small business while Forest Service sales procedures may make it impossible for them to survive by virtue of a lack of the indispensable raw material in logging, namely stumpage.

Any attempt to preclude large firms from bidding on smaller tracts is, in a way, a denial of the democratic process described earlier. However, whereas the large firm can bid for small tracts, small firms are unable to bid for large tracts because of obvious financial limitations. Thus any measures the Forest Service may decide to take could be viewed as an effort to make the survival struggle more nearly equal.

Allowable and Actual Annual Cut

Considering the importance of the question in so many substantive issues, we might examine some of the recent data on the relation between the actual and the allowable cut of Forest Service timber. This is shown in Table 6 for the Fiscal Years 1955 and 1956. According to the information available for the ten regions, in both years the actual cut was just under 70% of the allowable cut, with the figures for some areas (excluding Region 10) as low as 36% (in Region 7

in Fiscal 1956) to somewhat over 104% in Region 8 in the same year, a good jump from the 86% figure in the preceding year. Omitting Region 10 from the picture, the actual cut in Fiscal 1955 was 75.6% of the allowable and 74.6% in Fiscal Year 1956.

These figures must occasion pause for they suggest that if there were sufficient funds to process the sales and put in access roads in some areas, then over the period covered the Forest Service stumpage offerings would have been about 1/3 larger than they actually turned out to be.* It would seem that if this amount of stumpage had been marketed, the net effect would have probably been to drop stumpage prices and to lower lumber market prices below the depressed levels of recent years.** This outturn must be borne in mind as one of the consequences of any effort on the part of the Forest Service to enlarge substantially its stumpage sales--assuming it could overcome the various technical obstacles currently impeding this outcome.

Price as a Lever to Foster Competition and Forestry Ends

Another point worth making in this general discussion of price as a functional lever is that stumpage prices can and ought to be used in certain areas either to foster competition, or to draw new firms into an area for any one of several reasons, chief among which is the need to promote the forestry objectives of the Forest Service. For example, insofar as timber circles are not being worked because of the absence of logging firms in the region, the one strong instrument that the Forest Service does have to attract them to an area consists of price concessions.*** What must be done is,

* One reason, apparently, for the discrepancy between actual and allowable cut is the roughly zero value of some of the stumpage in the present market, e.g. in Alaska, there is practically no alternative to withholding this timber.

** This could lead to new protests from lumber operators with inventories of lumber and from owners of private forest preserves.

*** In some areas--Alaska, again provides an illustration--this probably could not be accomplished without subsidy. The latter raises a whole host of new difficulties with features probably less desirable than failing to harvest the timber. Rising lumber markets and more economical transport may ultimately resolve this problem.

Table 4

Allowable and Actual Annual Cut

Fiscal Years 1955 and 1956

By Regions, in MMBF

Region	Fiscal 1955			Fiscal 1956		
	Allowable	Actual	%	Allowable	Actual	%
1	906.0	859.1	93.9	1,453.4	944.5	64.9
2	526.5	230.3	44.2	434.4	282.5	65.0
3	372.9	278.2	74.6	372.9	311.6	83.6
4	479.5	249.5	50.2	501.3	294.0	58.6
5	1,352.7	832.6	61.6	1,377.7	1,056.4	76.7
6	3,022.5	2,625.2	86.8	3,342.0	2,655.0	79.4
7	206.5	91.4	45.6	314.8	112.7	35.8
8	739.5	626.7	85.7	679.2	707.5	104.1
9	476.6	314.6	66.0	486.3	324.8	66.8
10	930.5	182.5	19.6	930.5	219.3	22.7
Totals	9,013.2	6,290.1	69.8	9,892.5	6,908.3	69.8

at least initially, to permit what might otherwise seem to be an inordinate profit allowance, or even to job the stumpage at nominal prices.*

The technique of extra profit allowances might be employed, for example, in those areas where the differences between allowable cut and actual cut is widest, or in areas where the Forest Service is interested in community stabilization or in cases where firms are driven to suspend operations through cutthroat competition. The attention of the latter firms especially might be called to favorable stumpage opportunities in other regions.

Observations on the Application of the Pricing Goals

If it is agreed that the functional objectives of pricing are twofold, namely, to move the allowable cut into use and to assist the lumber industry to assume its necessary long-run stature, then it would appear that no uniform relation of either a profit margin, rate of return, or other criterion in appraisal is likely to be suitable in all regions or in any one region over lengthy periods of time. What will move stumpage into the hands of loggers at one location, say a prospect of a 10% return on sales, might be regarded as too scanty and insignificant at another place. Where plants are already established and sharp competition with other firms for timber exists, and where equipment is already substantially depreciated, firms might readily accede to a lower return without abandoning operations. To induce logging activity in a new area where risks and initial costs of plant are likely to be higher might require sharp stumpage price reductions. Any attempt on the part of the Forest Service to adhere to an undeviating formula of prices, applicable to all areas and all sales, is unlikely to be functionally serviceable. There could be no criticism of discrimination or special treatment if more favorable appraisal rates to prospective buyers are granted in these situations, so long as the opportunities were held generally open to all bidders. A policy of an equal appraisal ratio or formula, regardless of special circumstances, would itself be discriminatory: an attempt to treat "unequal" or dissimilar operating circumstances as if they were "equal" or similar is as discriminatory as an attempt to treat equals unequally. This last result occurs whenever a rigid pricing formula is used without regard to the purposes to be accomplished by pricing.

* It may well be that in certain cases of marginal stumpage even a 50% reduction in appraisal fails to attract buyers, i.e., the demand for it may be virtually inelastic, with a very low maximum price. If the future price outlook is likely to improve, prudence would suggest withholding such stumpage from the current market.

All of this points up the fact, which we shall find amply confirmed by more extended study, that no simple pricing rule, unaltered in substance or definition, is likely to prove functionally feasible in all places, all circumstances, and all times.

II. SOME DATA ON PROFIT MARGINS AND RATES OF RETURN

In this section we consider some data reflecting the experience extending over many years, recent as well as past, of gross profit ratios in various industries over a time span encompassing a diversity of economic conditions. Perhaps a few introductory words are in order on the interpretation of this data.

In the first place, data on the ratio of gross profits--profits before corporate income taxes--to sales receipts are probably more accurate and less ambiguous than most alternative types of profit information that are usually presented. The concept of sales receipts or operating revenues in business enterprise is rather clear-cut, without the fuzzy edges above or below the surface involved in using data on investment or asset totals. Valuation problems enter into sales data only in small degree; the figures are primarily resultants of market phenomena, of concrete information on the prices at which the goods are sold multiplied by the volume of sales. For these reasons, figures on sales receipts extending over past years are likely to be more accurate than most economic data.

Likewise, figures on gross profits, or profits before corporate income taxes are also reasonably accurate, with the chief arbitrary elements involving depreciation allowances and inventory changes (and their valuation). Yet these entail almost minor difficulties compared to any attempt to apply valuation procedures to plant and equipment. So long as depreciation and inventory appear to be calculated on much the same basis from year to year, these components are unlikely to have undue influence on the profit calculations over time.

A comment on the use of gross rather than net profit data; in the first place, the use of the latter would mean an alteration with every change in the tax laws. Secondly, and most important, industry pricing practices must be such as to recover from sales proceeds both net profits and the tax sums paid. So long as the relevant market figure is that of gross proceeds, or proceeds with ultimate tax sums included, the direct figure for purposes of comparison is that of gross profits. It is clear that the profit sum that industry in general seeks to maximize is that of profits before taxes; so long as profits before taxes are as high as it is possible to make them, then profits after taxes will be at the maximum obtainable. Thus the same reasons that prompt merchandise people to fix gross mark-ups in detailing their pricing procedures lead us to work in terms of gross profits to sales.

Return-on-Investment Problems

Little information on rates of return on invested capital is included, at this time, for several reasons; it is well that we make them patent so that the omission is understood.

Firstly, the information on both assets or the value of plant and equipment is relatively meager on anything resembling a comparative base extending over any lengthy period of time. Why this is so ought to be rather apparent, considering the formidable problems involved in valuing plant and equipment which has been in existence for many years, and which will remain in being through the future. What value ought to be used? The original cost of plant? Clearly this is often utterly irrelevant, especially when the plant was built in a past era under different technological circumstances and with a much different price level. Reproduction cost? This is highly conjectural and uncertain, especially when reproduction is still off in the future, with future technology and price levels completely shrouded in doubt. Current replacement costs? But if the plant is not due to be replaced immediately this would mean continuous and rather meaningless revaluations every time prices changed. Book value? But this generally represents an accounting convention rather than a strictly economic figure, a resultant of the valuation policy and the treatment of asset items by the firm. Current sale value of the plant and equipment? Plant hardly has a meaningful value in these terms; we need only ponder the problems of trying to sell an electric power plant or a railroad spur line immediately.

Thus, compared to the problems that arise in any attempt to use formulas based on the value of investment as a key to pricing policy, the use of price mark-ups commends itself by virtue of its simplicity. Its problems and difficulties are instantly reconcilable as against the large and continuous obstacles and obstructions, the insoluble differences and collisions in the use of investment-value methods. Experience with public utility rate regulation, and its expensive, often interminable courtroom procedures, with legalistic interpretations, rehearings, wranglings, appeals, etc., do not seem to constitute an inviting spectacle for emulation in any area of the economy where the choice of a pricing technique is still open. It may be surmised that there are rather few economists today who would recommend pricing techniques based on a "reasonable return on prudent investment-value" as conducive to an optimal system, facilitating the functioning of the economy and the most desirable use of productive resources.* Events in recent years, where rate increases in public utilities have occurred in response to plant revaluation rather than higher operating expenses, have done even less to commend this as a pricing device; the opinion may be vouchsafed that the current arguments for rate increases in these cases, based on rising capital equipment costs and higher interest

* This assertion could be documented; it is based on familiarity with the professional literature of economics rather than on the basis of a headcount of individuals who termed themselves economists.

rates, will boomerang in periods of lower prices and lower interest rates; there is no assurance that the latter phenomenon will not occur again.

There are these additional difficulties in even a tentative acceptance of pricing based on the value of investment, or as governed by a rate of return on investment value. In the first place, the investment value important in economic analysis is not the existing value of plant and equipment, but the new plant construction and new equipment installed: in economics as in life generally, by-gones are by-gones. What is decisive to the businessman in expansion plans is the income possibilities on new construction rather than the return on some historic value of the old plant: with an old plant, what is necessary to keep operations going is that variable charges (including administrative costs) be covered; it is not necessary that any definite or stipulated rate of return on old and depreciated equipment be recovered; it may often even be impossible to secure a return on outmoded equipment after technological advances have occurred: earnings prospects, however, must be good enough to warrant the firm staying in the field and replacing or enlarging its capital assets.

Thus it is important that rates of return on new equipment be remunerative. But to assure this requires an outlook on the future: current phenomena by themselves are not decisive. In order to apply an investment-value method, therefore, the Forest Service, say, would have to have good information on new investment value, which would require access to the books of account of the firms bidding on Forest Service timber, and it would have to make some estimate of the validity of these figures, determining the extent to which they were representative, or inflated, or overstated, in order to arrive at a decision in favor of lower appraisal prices of Government stumpage. The upshot is likely to be an endless round of valuation investigations, hearings, interpretations, differences of view, reconciliations, and re-examinations. Judging from public utility experience, matters would, in periods of economic flux, be largely in the hands of courts or administrative agencies, with the final decisions made largely by lawyers adhering to precedent rather than economic fact or analysis of the pricing measures required to accomplish an economic, not a legal, objective.

For all these reasons, plus the very good one enunciated at the start, namely, the paucity of meaningful data on the value of investment, this section will concentrate on the gross profit ratio experience in the American economy.

Use of The Investment-Value Method

Despite this adverse judgment for the general application of the investment-value method, it would nevertheless have its place in the total appraisal scheme as some partial check on other results

(from cruder investment-value data than would be required if the techniques were widely used), and as a direct appraisal approach in very large, single-bidder transactions, or where substantial technological diversity exists among firms, or for instances in which the Forest Service is interested in attracting new lumbering firms into certain areas to further its forestry goals.

Manifestly, in any use of the investment-value return method, the numerator of the ratio will consist of profit data, the same figures that enter into the profit-ratio approach. And when these profits are too low, lower stumpage appraisals will be called for. Yet these same results can ordinarily be secured, at least for most situations, by using the simpler profit ratio formulae in appraisal techniques with a background gathering by the Forest Service of profit trends and investment trends, even while it does not attempt to use the investment-value approach directly or extensively in its sales operations.*

Profit Margins and Profit Trends After World War I

To begin our examination of profit margins in industry in general, we might examine some data covering the postwar years of World War I, to lend a little of historical perspective. In Table 7, there are high-low and average ratios of profits to sales, both before and after taxes, in corporations producing durable and nondurable goods. Also included are similar ratios of profits to net worth.

In the case of the durable goods firms the ratios ranged from 3.4% for profits (before taxes) to sales to a high of 14.3%. The corresponding figures for the nondurable goods firms, as might be expected, showed a lesser variability, fluctuating from 2.8% to 8.8%. After taxes, the corresponding figures were 2.1% to 10.4% and 2% to 7.3%. Ratios to net worth, of profits before taxes were 2.3% to 16.9% for durable goods producers and 3.9% to 19.1% for the nondurable goods firms. After taxes, the respective ratios were 1.4% to 11.5% and 2.7% to 14.3%.

The averages for the eight year post-World War I period show a profit margin before taxes of 10.4% and 6.9%, respectively, and after taxes of 8.6% and 5.9%. Profits to net worth, for both

* Certain industry representatives have indicated their preference for an appraisal technique that is based on the rate of return on investment-value. Although the tentative remarks above indicate strong doubt as to the wisdom of this procedure for general application, the ideas ought to be developed at more length in a separate memorandum at a later date. Attention could then be paid to the feasibility of the method and the possible modifications that would occur in appraisals as a result of its use. For some applications, see Part VI below.

categories, and before and after taxes, ranged from about 9% to 11%.

Table 7. High-Low and Average Profit Ratios of Durable and Nondurable Goods Corporations, 1919-1926.

	<u>High Ratio</u>	<u>Average for Period</u>	<u>Low Ratio</u>
<u>Durable Goods Corporations</u>	:	:	:
Profit before Taxes	:	:	:
to Sales	14.25	10.42	3.36
Profit after Taxes	:	:	:
to Sales	10.41	8.62	2.10
Profit before Taxes	:	:	:
to Net Worth	16.87	10.77	2.26
Profit after Taxes	:	:	:
to Net Worth	11.49	8.88	1.41
	:	:	:
<u>Nondurable Goods Corporations</u>	:	:	:
Profit before Taxes	:	:	:
to Sales	8.82	6.94	2.84
Profit after Taxes	:	:	:
to Sales	7.27	5.87	1.96
Profit before Taxes	:	:	:
to Net Worth	19.08	11.28	3.89
Profit after Taxes	:	:	:
to Net Worth	14.32	9.43	2.68
	:	:	:

Source: Dr. Thor Hultgren, "Sales vs. Profits", Business Cycles and Corporate Earnings--Preliminary draft, National Bureau of Economic Research.

A Historical Record of Profit Ratios

A good historical record of profit ratios is provided through the recent studies of Dr. Thor Hultgren.* As shown in Chart 6, for nondurable goods corporations in the years since 1922 the range of profits to sales has been from a negative (= loss) figure of -1.2% in 1932 to a high of 9.8% in 1943. For the durable goods corporations the figures run from a -15.5% in the depression through 1932 to a high of 14.8% in 1941.

* Dr. Hultgren has kindly permitted the use of his research prior to its publication. He has emphasized that the results are still tentative. The full tables appear in the Statistical Appendix.

RATIO OF CORPORATION PROFITS, BEFORE TAXES, TO SALES

PERCENT

Chart 6

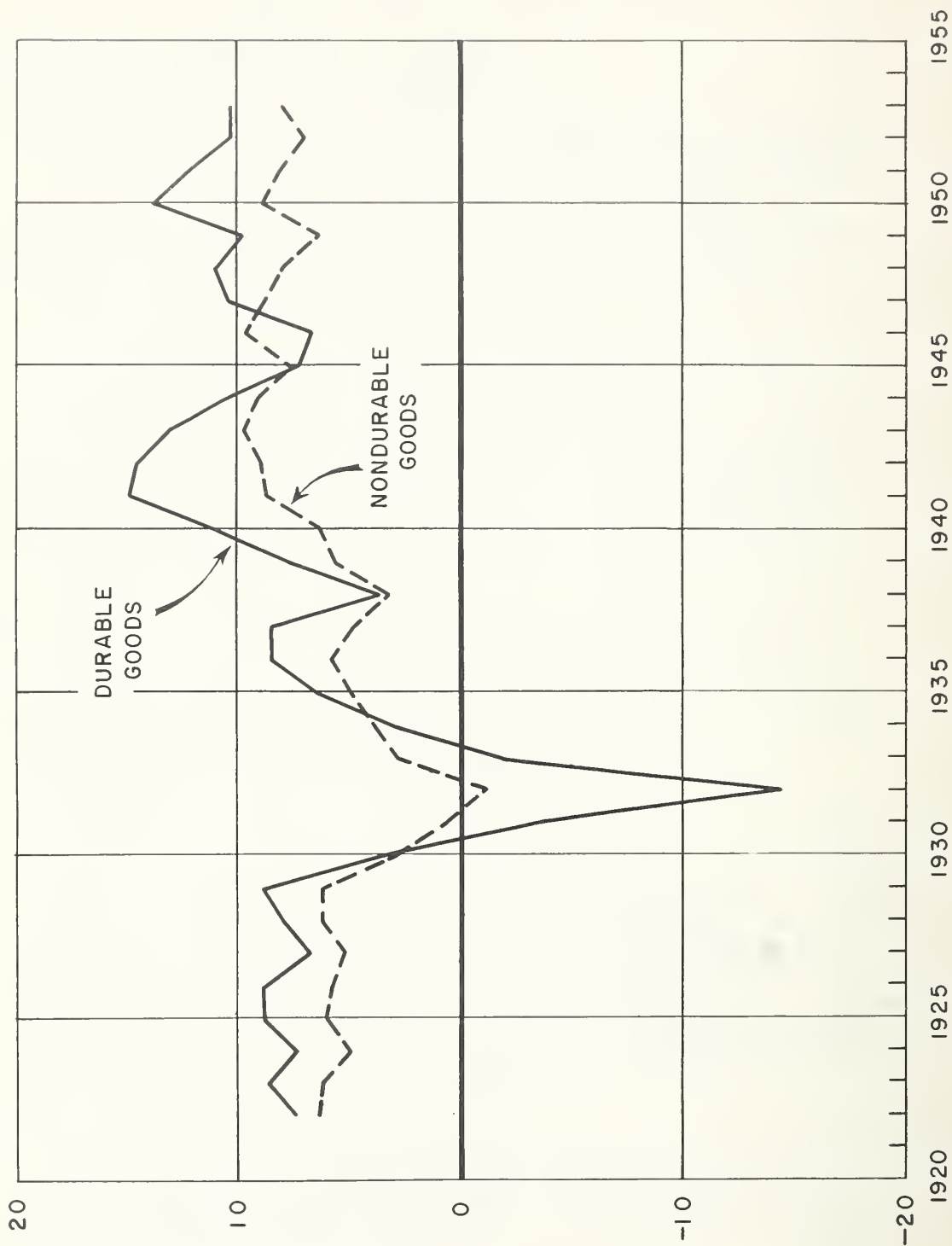


Table 8. Profit Ratios of Durable and Nondurable Goods Manufacturing Corporations
by Four-Five Year Periods Since 1922

Period	To Sales				To Net Worth			
	Before Taxes Nondurable	Durable	After Taxes Nondurable	Durable	Before Taxes Nondurable	Durable	After Taxes Nondurable	Durable
1922 - 1925	5.88	8.05	5.10	6.98	----	----	----	----
1926 - 1930	5.22	7.17	4.56	6.19	7.41	8.22	6.46	7.11
1931 - 1935	2.19	-2.33	1.64	-2.87	2.69	-.26	2.09	-.58
1936 - 1940	5.09	7.78	4.09	6.06	7.73	10.06	6.22	7.80
1941 - 1945	8.78	12.01	4.07	4.54	18.35	29.51	8.44	10.96
1946 - 1950	8.34	10.28	5.12	6.01	19.98	22.11	12.29	12.94
1951 - 1953	7.58	10.75	2.92	4.46	18.04	26.92	8.93	11.18
Average, Full Period	6.15	7.67	3.93	4.48	12.37	16.09	7.41	8.24

Source: Hultgren, Op. cit.

For the same period, the profit ratio to sales after taxes are -1.6% to 6.0% for the nondurables and -15.6% to 7.7% (in 1925) for the durable category. To net worth, before taxes, the corresponding range is -1.0% to 22.6% for the nondurable and -6.4% to 36.8% for durable goods firms (see Chart 7). The rather wide divergence between these figures reflects primarily the depression results compared to the wartime profit inflation (after an undcutted write-down of net worth in the depression decade of the 1930's). After taxes the corresponding ratios to net worth were -1.4% to 14.2% and -6.4% to 16.8% respectively.

Further light can be secured by working with (four or) five year averages of this data. For nondurable goods manufacturing corporations (Table 8) it appears that the profit margin (of profits to sales) ranged from just over 2% in the early 1930's to 8.3% during the war years, averaging out to 6.2% over the full period. The story is quite the same in the case of durables, with the low being a negative 2.3% and the high, 12.0%, with the average being 7.7%.

After taxes, for nondurables the average is 3.9% and, for durables, 4.5%. The range for the former is from 1.6% to 5.1% in the immediate postwar period. For durables the comparable figures are -2.9% and 7.0%.

The net worth comparisons are 12.4% and 16.1% as the respective averages before taxes over the full period, and 7.4% and 8.2% as the after-tax figures. The range here is somewhat closer, at least on the high side though the durable goods industries experienced net losses in the early 1930's even while the nondurable classification showed some positive profits, as shown by the computation of 2.1%.

Profit Ratios for Trading Corporations

The profit experience and profit ratios of trading corporations, as expected, show a smaller range of variability than is the case of manufacturing corporations. For example, examining the before-tax data, the ratio of profits to sales fluctuated between a low of -3.2% in 1932 to a high of 5.8% in 1946. Likewise, with respect to the data for net worth the corresponding figures ranged from -6.6%, the low in 1932, to 31.2% in the postwar year of 1946 when prices rose rapidly and inventory profits were high. After-tax data follow the same general pattern, with a low of -3.3% in 1932 to 3.7% in 1946. To net worth, the statistics yield a high-low for the same years of -6.9% to 19.8%.

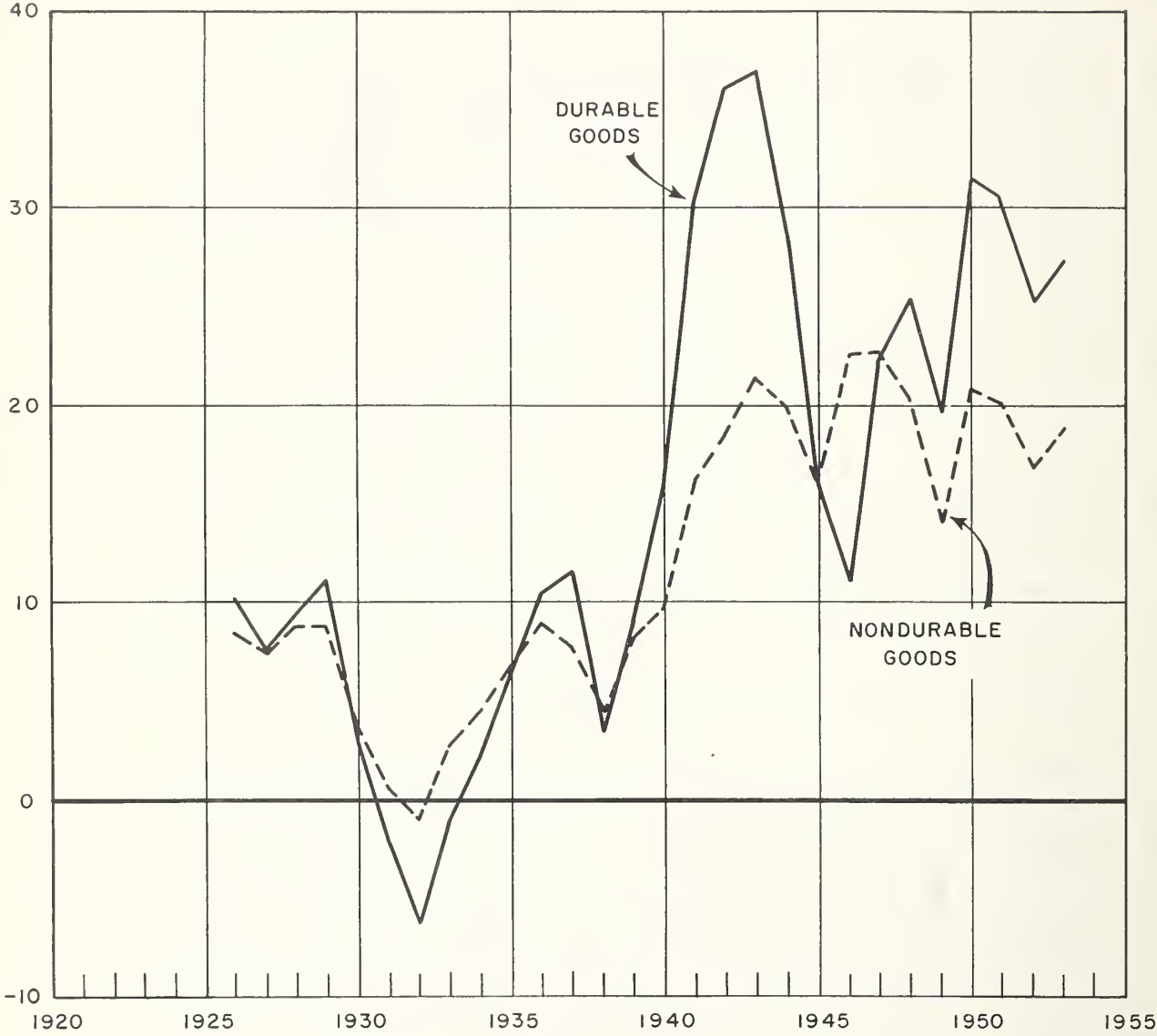
Condensing the data into a series of averages by five year periods the results appear in Table 9.

As the short table discloses, the average ratio of profits to sales before taxes averaged just 2.6% over this period and, after taxes, the ratio figures at about 1.6%. To net worth, the

Chart 7

RATIO OF CORPORATION PROFITS, BEFORE TAXES, TO NET WORTH

PERCENT



corresponding figures were 12.2% and 5.3%. Profits to sales ratios thus seem to have been remarkably stable for trading corporations over this whole period; the net worth figures disclose a greater variability, in part attributable to the write-down of the surplus accounts over part of this period.

Table 9. Profit Ratios to Sales and Net Worth of Trading Corporations, By Periods Since 1922

Period	To Sales		To Net Worth	
	Before Taxes	After Taxes	Before Taxes	After Taxes
1922 - 1925	2.71	2.30	----	----
1926 - 1930	1.71	1.42	5.34	4.48
1931 - 1935	- .35	- .59	- .14	- .78
1936 - 1940	1.96	1.53	7.34	5.74
1941 - 1945	4.89	2.22	21.21	9.67
1946 - 1950	4.44	2.77	23.88	14.89
1951 - 1952	3.00	1.49	15.61	7.73
Average,				
Full Period:	2.62	1.59	12.21	5.29

Source: Hultgren, op. cit.

Profit Ratios for Construction Corporations

Similar data for construction corporations appears in Table 10. What seems most remarkable at first glance is the fact that the ratio of profits to sales, before taxes, seems so astonishingly low over the entire period covered since 1932, with the peak ratio appearing in the war year 1942 when so much of war plant construction was in progress. The peak figure was one of 7.4%, which is quite low by comparison to durable-nondurable manufacturing outputs. It must be remembered, however, that building sales run to a higher value per transaction, so that absolute profits per transaction are apt to be greater than in most any other case. That this is so is disclosed in the data on profits to net worth, where the showing is distinctly closer to the ratios that we have come to expect from experience with the other industrial classifications.

In recent years the ratio of profits before taxes to sales has ranged from 4% to 5.5%; after taxes (since 1941) the figure runs from under 2% to nearly 3.5%. To net worth, the figures over the same period run from 20% to 26% and, after taxes, from 10% to 16%. The averages over the full period yield the very small ratio of profits to sales of 2.8% before taxes and 1.1% after taxes. To net worth, the figure is just under 14.5% before taxes and 7.2% after taxes.

The main implication of this study of the profit margins in the construction industry, and it is one worth making in view of the all too common complaint that a high profit margin on sales is

necessary in manufacturing industry in order to sustain a firm in business and assure the growth and stability of the industry, is simply that the latter proposition is not true. The construction industry, we are all well aware, has been operating in recent years at peak levels compared to other periods in its history. It has attracted capital, led to the formation of new firms, and the growth of old ones, while contributing to the removal of so much of our housing and plant shortage. All this has been accomplished on a profit margin to sales which has usually been in the neighborhood of 5%.

The construction data is summarized in Table 10.

Table 10. Profit Ratios to Sales and to Net Worth of Construction Corporations, By Periods Since 1932

Period	To Sales		To Net Worth	
	Before Taxes	After Taxes	Before Taxes	After Taxes
1932 - 1935	-3.27	-3.79	-3.42	-3.89
1936 - 1940	2.01	1.37	5.66	3.85
1941 - 1945	5.52	2.31	23.79	9.92
1946 - 1950	5.57	3.46	25.64	15.94
1951 - 1952	4.04	1.96	20.79	10.16
Average,				
Full Period:	2.77	1.06	14.49	7.18

Source: Hultgren, op. cit.

Profit Ratios for Public Utilities

It is well to spend a moment on similar data for the public utility field, as a further indicator of the variability of mark-up ratios among the different industries. From the record for the Bell Telephone System, extending back to 1920, it is clear that the profit margin to sales before taxes has hovered about 20% over most of this period, a rather high ratio as compared to most other industries. Yet when the comparison is made to net worth, the results more nearly approximate those found in other industries. (See Appendix)

This is only surprising on a first acquaintance with the situation. For the telephone industry, like practically all public utilities, is marked by a heavy usage of equipment relative to labor and raw materials in producing its peculiar output. That is to say, the public utility industries are ordinarily the capital-intensive industries and hence, less of the total of sales proceeds needs to be devoted to paying wages and raw materials costs, and proportionately more must be diverted to returns on capital invested, whether by way of dividends to stockholders or of interest payments to bondholders. That profits

after taxes have held so remarkably stable is a reflection, largely of the regulatory activities of the various public utility commissions.

The data for electric utilities follow the same general pattern, with the profit to sales margin being even larger, more nearly approaching 25%. On the other hand, the figures on net worth after taxes more nearly correspond to that of the telephone companies. (See Appendix)

The data on gas companies reveal much the same pattern. From 1940 to 1946 the ratio of profits to sales ran from 25% to 30%. Since 1946 the figures have ranged from 16% to 20%. Profits to net worth after taxes have again shown up as more stable, being in the neighborhood of 9% over a good part of this period. (See Appendix)

With respect to railroads the data generally disclose the wavering fortunes of this industry which seems capable of rising to rather sharp peaks and falling to deep troughs. On profits to sales, as we are again dealing with a heavy capital-using industry the data sometimes rise to upwards of 20%, as in the war years, and below 10%, as in some of the postwar years. The data on profits to net worth of railroads (after taxes) attest to the plight of this industry (despite the well-known problems in interpreting and using data based on net worth where so many historical transformations of the capital account have occurred).

Profit Ratios of Large Manufacturing Corporations

Some more light on profit ratios comes from the data collected by the Federal Reserve Board covering 200 large manufacturing corporations. Statistics covering the years since 1951 are indicated in Table 11. According to this data the ratio of profits to sales of all 200 corporations covered in the survey averaged close to 14% for the full period. Over the same period (1951-1956) the profits to sales ratio in the case of 94 nondurable goods corporations averaged close to 15%, with the range being the moderate one of 13.4% to 18.2%. For durable goods firms, comprising 106 corporations, the average was 13.3%, with the range running from 12% to almost 16%.

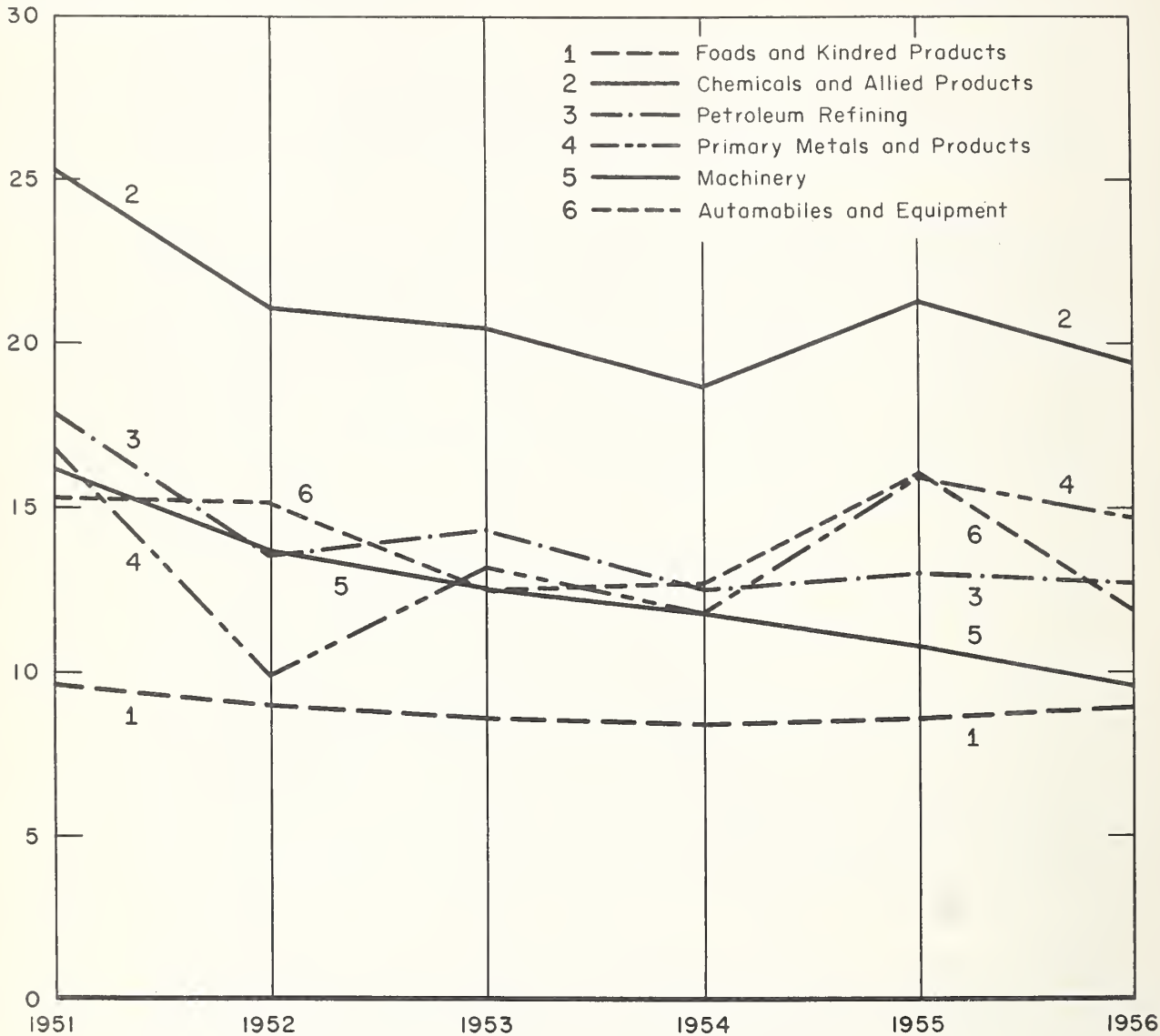
Examining the particular industry break-down, an average of 8.8% is disclosed; for Foods and Kindred Products Firms the range narrows between 8.4% and 9.6% for the 28 firms included in this sample. In Chemicals and Allied Products (26 firms) the profit-sales margin is substantially higher, running to an average of 21%, with small variability over most of the years involved. In Petroleum Refining, for 14 corporations, the average was almost precisely 14%, with the range going from 12.5% to 18%. (See Chart 3)

Primary Metals and Products, covering some 39 corporations, showed a profit ratio to sales of some 13.7%. For 27 Machinery manufacturing corporations, the average over this period was 12.5% and

Chart 8

RATIO OF PROFITS BEFORE TAXES TO SALES, LARGE CORPORATIONS,
IN SELECTED INDUSTRIES, 1951 - 1956

PERCENT



for 15 Automobile and Equipment firms the corresponding figure was almost 14%.

Table 11. Sales and Profits Before Taxes of Large Manufacturing Corporations (millions of dollars)

	1951	1952	1953	1954	1955	1956
<u>Total</u> (200 Corps.)						
Sales	52,940	54,517	63,343	58,110	69,876	71,901
Profits Before Taxes	8,869	7,308	8,375	7,244	10,250	9,253
Ratio: Profits to Sales	16.8	13.4	13.2	12.5	14.7	12.9
<u>Nondurable Goods Industries</u> (94 Corps.)						
Sales	18,916	19,266	20,694	20,620	23,106	24,762
Profits Before Taxes	3,447	2,853	3,028	2,753	3,413	3,468
Ratio: Profits to Sales	18.2	14.8	14.6	13.4	14.8	14.0
<u>Durable Goods Industries</u> (106 Corps.)						
Sales	34,024	35,251	42,649	37,490	46,770	47,139
Profits Before Taxes	5,422	4,455	5,346	4,491	6,836	5,784
Ratio: Profits to Sales	15.9	12.6	12.5	12.0	14.6	12.3

Source: Federal Reserve Bulletin.

Recent information on profit margins is also available in the case of the public utilities. According to Table 12, Class I Line-Haul Railroads averaged slightly over 12% in the years 1951-1956. On the other hand, evidencing largely the difference between a rather profitable as against a fairly depressed public utility, the electric power corporations showed a profit margin which averaged about 26.5% to sales. The Bell Telephone System operating through the United States, averaged about 21%.

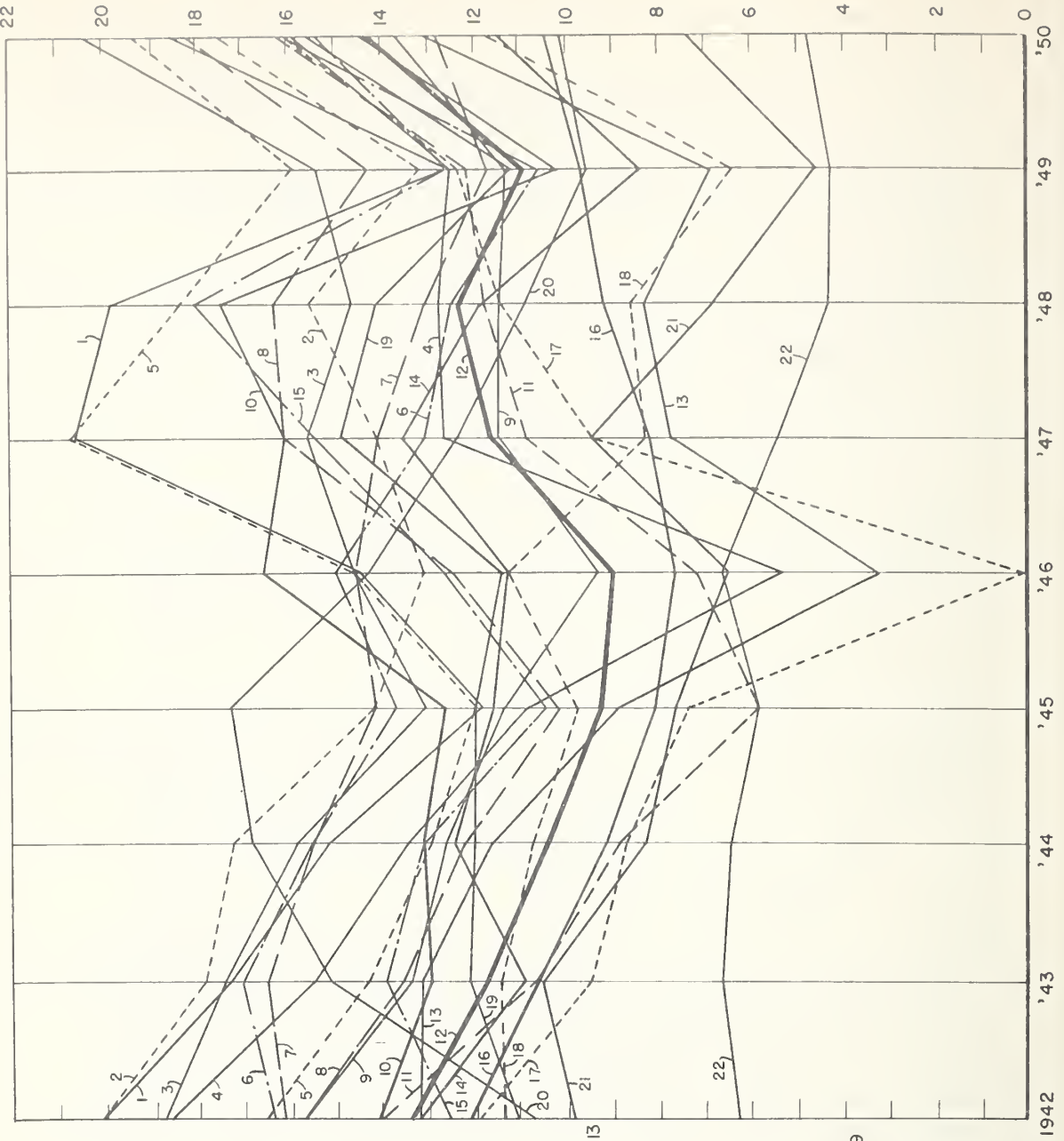
Profit Ratios: Listed Manufacturing Corporations, 1942-1950

Further detail on industry profit margins as a percent of sales can be derived for manufacturing corporations covering the years 1942-1950. As can be seen from Chart 9, there is much volatility and instability in the pattern, creating a fairly crazy-quilt result, of criss-cross and back. As a rule the highest profit margins are shown by non-ferrous metals, chemical, pharmaceutical and cosmetic, building material, beverage, paper and allied products, printing and allied industries, photographic and scientific

OPERATING PROFIT AS A PERCENT OF SALES FOR LISTED MANUFACTURING CORPORATIONS

1942-1950

Chart 9



INDUSTRY

- Non Ferrous Metals, 1
- Professional and Scientific Instruments, 2
(Photographic and Optical)
- Chemicals and Allied Products, 3
- Machinery, Parts, and Equipment, 4
- Paper and Allied Products, 5
- Drugs, Medicines, Cosmetics, Soaps, 6
- Beverage Industries, 7
- Building Materials and Equipment, 8
- Miscellaneous Manufacturing, 9
- Textile Mill Products and Apparel, 10
- Metals: Iron and Steel, 11
- All Manufacturing, 12
- Communication Equipment and Related Products, 13
- Lumber and Wood Products, 14
- Oil Refining, 15
- Tobacco Products, 16
- Transportation Equipment, 17
- Rubber Products, 18
- Household Machines, Appliances, and Utensils, 19
- Printing, Publishing and Allied Industries, 20
- Leather and Leather Products, 21
- Food and Kindred Products, 22

instruments, and textile mill product firms.* On the more consistently low side, there are the food industries, communications, equipment, leather and leather products, rubber products, tobacco, and transportation equipment industries.

Table 12. Operating Revenue and Profits Before Taxes of Public Utilities (millions of dollars)

	1951	1952	1953	1954	1955	1956
<u>Railroad**</u>						
Operating Revenue	10,391	10,581	10,664	9,371	10,106	10,551
Profits Before Taxes	1,260	1,438	1,436	908	1,341	1,267
Ratio: Profits to Oper. Rev.	12.1	13.6	13.5	9.7	13.3	12.0
<u>Electric Power***</u>						
Operating Revenue	6,058	6,549	7,136	7,588	8,360	9,059
Profits Before Taxes	1,482	1,740	1,895	2,049	2,304	2,457
Ratio: Profits to Oper. Rev.	24.5	26.6	26.6	27.0	27.6	27.1
<u>Telephone****</u>						
Operating Revenue	3,729	4,136	4,525	4,902	5,425	5,966
Profits Before Taxes	691	787	925	1,050	1,282	1,430
Ratio: Profits to Oper. Rev.	18.5	19.0	20.4	21.4	23.6	24.0

Source: Federal Reserve Bulletin.

Clearer insight can be derived from examining Table 13, containing the nine-year averages and high-low figures. So far as the general average goes, the highest figure appears in non-ferrous metals, followed closely by chemicals, and paper and allied products. On

* See Appendix.

** Class I Line-Haul Railroads (which account for 95% of all railroad operations).

*** Class A and B Electric Utilities (which account for about 95% of all electric power operations).

**** Operations of the Bell System (representing about 85% of all telephone operations).

the low side, the two industries that fall below the general average are the food and the leather product industries.

Table 13. Operating Profit as a Percent of Sales of Listed Manufacturing Corporations, 1942-1950:
High-Low, and Average Ratio

Industry	High	Average	Low	High-Low Spread
All Manufacturing	14.3	10.1	9.0	5.3
Beverage Industries	16.5	14.3	11.7	4.8
Building Materials and Equipment	18.2	14.4	10.2	8.0
Chemicals and Allied Products	20.3	16.2	13.1	7.2
Communication Equipment and Related Products	13.3	9.6	3.2	10.1
Drugs, Medicines, Cosmetics, Soaps	17.1	14.4	10.3	6.8
Food and Kindred Products	6.6	5.6	4.3	2.3
Household Machines, Appliances and Utensils	15.5	12.7	11.1	4.4
Leather and Leather Products	10.6	7.9	4.6	6.0
Lumber and Wood Products	13.6	11.7	8.4	5.2
Machinery, Parts and Equipment	18.7	13.1	5.3	13.4
Metals: Iron and Steel	16.1	10.9	5.9	10.2
Non-ferrous Metals	20.6	16.8	11.9	8.7
Oil Refining	18.1	13.8	10.5	7.6
Paper and Allied Products	20.7	16.2	12.0	8.7
Printing, Publishing and Allied Industries	17.3	13.0	9.6	7.7
Professional and Scientific Instruments (Photographic and Optical)	20.1	15.9	13.1	7.0
Rubber Products	11.6	10.0	6.4	5.2
Textile Mill Products and Apparel	17.5	14.2	12.7	4.8
Tobacco Products	12.2	9.5	7.7	4.5
Transportation Equipment	16.0	9.8	.8	15.2
Miscellaneous Manufacturing	15.7	12.3	9.3	6.4

Source: See Appendix.

The greatest high-low variability (if we neglect the transportation equipment listing) appears in the manufacture of machinery, where the high-low profit spread over the period covered amounted

to some 13.4%. Only communication equipment and metals showed a spread of as high as 10%. In the case of lumber and wood products the swing was of 5.2%, in about the middle of the industrial range, neither on the high or the low side.

Operating Profit for Listed Corporations Engaged in Trade

To round out the record a trifle further and to point up the comparable performances of different phases of our industrial complex, Table 14 shows the profit ratios of firms engaged in retail trade and in wholesale trade, as well as the inclusive aggregate data. According to this, at the retail level the average for the 1945-1950 period worked out to some 7.2% while at the wholesale level it amounted to just under 5%, and in all trade to something just under 7%. Manifestly, these percentages run below the usual industrial ratios, reflecting the more rapid turnover of merchandise in trading outlets and the capture of unit profits on volume of operations, as well as the lesser use of capital equipment and the consequent smaller need for high gross profit margins to cover capital costs.

Table 14. Operating Profit as a Percent of Sales of Listed Corporations Engaged in Trade

	1950	1949	1948	1947	1946	1945	Average 1945/1950
Retail Trade	6.1	: 6.6	: 6.6	: 7.2	: 8.3	: 8.6	: 7.2
Wholesale Trade,		:	:	:	:	:	:
Commission and		:	:	:	:	:	:
Brokerage Homes	4.6	: 3.7	: 4.8	: 4.8	: 5.7	: 5.6	: 4.9
Total Trade	5.9	: 6.3	: 6.4	: 6.9	: 8.0	: 8.2	: 6.9
		:	:	:	:	:	:

Source: Economic Almanac (1956).

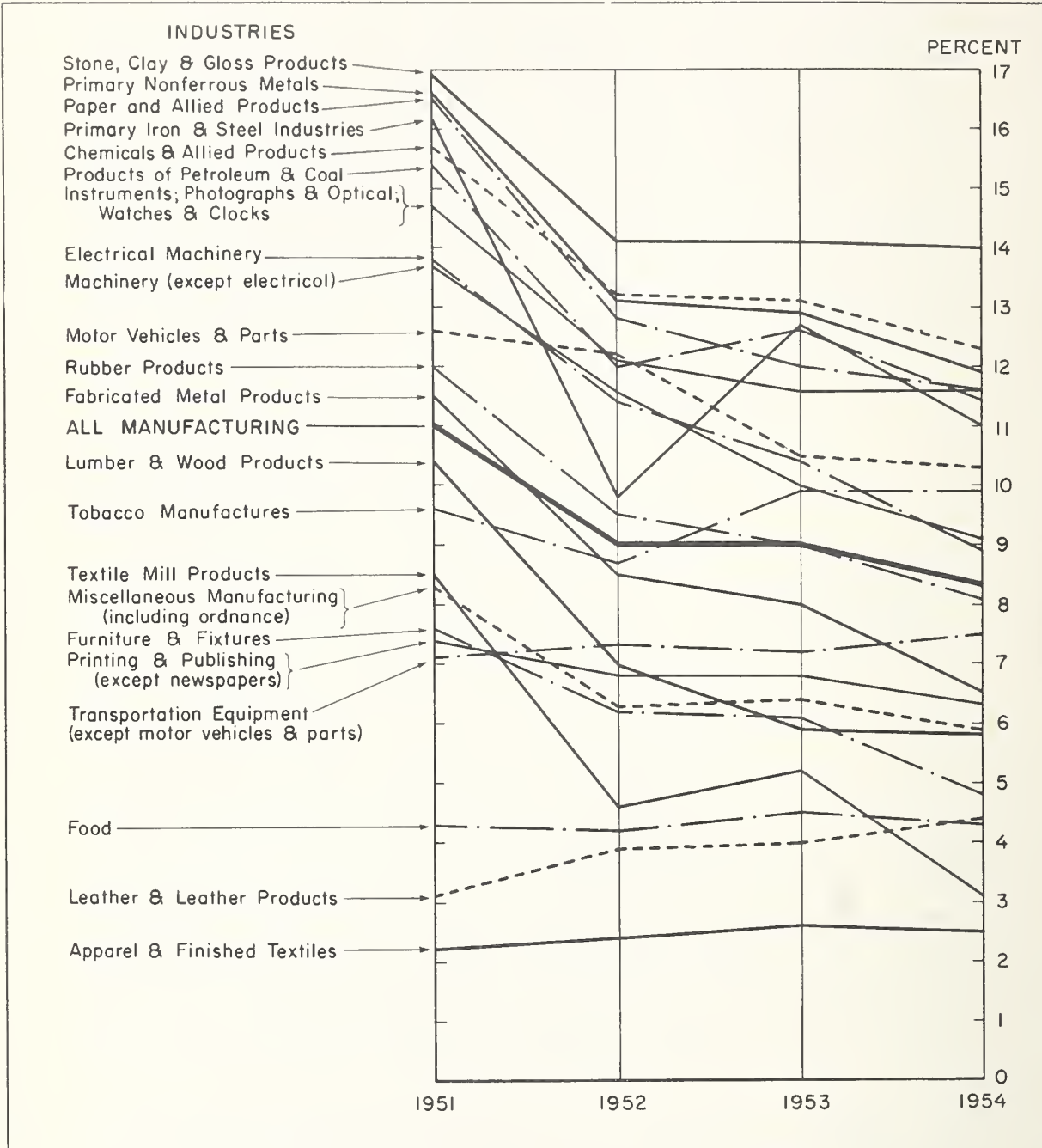
Profit Ratios: Manufacturing Corporations, 1951-1954

Table 15 discloses the profit ratios of all manufacturing corporations over the more recent period of 1951-1954. The averages for the period are also included. Further, as 1951 contained the speculative price wave and largely uncontrolled price movements following the Korean War action, separate averages have been computed covering 1951-1954 and 1952-1954. For the latter period the profit ratios, with hardly any exception, appear remarkably stable, with the range of variation seldom exceeding one or two percentage points. The ratios appear graphically in Chart 10.

Although the coverage of Chart 10 differs somewhat from Chart 9, for comparative purposes the differences are not significant. While the "all manufacturing" category fell by slightly over 1% between the 1942-1950 and 1951-1954 periods, the average ratio for the Lumber and Wood Products Industry slumped by 3% to 4%.

Chart 10

RATIO OF OPERATING PROFIT TO SALES, ALL MANUFACTURING CORPORATIONS,
BY INDUSTRY 1951-1954



What seems more striking is that whereas in the earlier period the Lumber etc. category had a profit margin in excess of the general average, being about 1 1/2% above, in the latter period its profit margin fell 2% to 2 1/2% below the average. Although the difference in coverage and definition may be responsible for the shift, this reversal from an above average to a below average figure was also shown by tobacco manufactures, textile mill products, and printing and publishing.

Table 15. Ratios of Operating Profit to Sales, All Manufacturing Corporations, by Industry 1951-1954

Industry	% Operating Profit to Sales				Averages	
	1951	1952	1953	1954	1951-1954	1952-1954
All Manufacturing	11.0	9.0	9.0	8.3	9.3	8.8
Food	4.3	4.2	4.5	4.3	4.3	4.3
Tobacco Manufactures	9.6	8.7	9.9	9.9	9.5	9.5
Textile Mill Products	8.5	4.6	5.2	3.1	5.3	4.3
Apparel and Finished Textiles	2.2	2.4	2.6	2.5	2.4	2.5
Lumber and Wood Products	10.4	7.0	5.9	5.8	7.3	6.2
Furniture and Fixtures	7.6	6.2	6.1	4.8	6.2	5.7
Paper and Allied Products	16.5	12.8	12.0	11.6	13.2	12.1
Printing and Publishing (except newspapers)	7.4	6.8	6.8	6.3	6.8	6.6
Chemicals and Allied Products	15.7	13.2	13.1	12.3	13.6	12.8
Products of Petroleum and Coal	15.4	12.0	12.6	11.4	12.9	12.0
Rubber Products	12.0	9.5	9.0	8.1	9.7	8.9
Leather and Leather Products	3.1	3.9	4.0	4.4	3.8	4.1
Stone, Clay and Glass Products	16.9	14.1	14.1	14.0	14.8	14.1
Primary Non-ferrous Metals	16.6	13.1	12.9	11.9	13.6	12.6
Primary Iron and Steel Industries	16.2	9.8	12.7	11.0	12.4	11.1
Fabricated Metal Products	11.5	8.5	8.0	6.5	8.6	7.7
Machinery (except electrical)	13.7	11.6	10.0	9.1	11.1	10.2
Electrical Machinery	13.8	11.4	10.4	8.9	11.1	10.2
Transportation Equipment (except motor vehicles and parts)	7.1	7.3	7.2	7.5	7.3	7.3
Motor Vehicles and Parts	12.6	12.2	10.5	10.3	11.4	11.0
Instruments; Photographic & Optical; Watches & Clocks	14.7	12.1	11.6	11.6	12.5	11.7
Miscellaneous Manufacturing (including ordnance)	8.3	6.3	6.4	5.9	6.7	6.2

Source: Economic Almanac (1956), pp. 282-285.

Profits to Sales, by Asset Size of Firms

According to available evidence there is a rather definite correlation between the asset size of the firms and the ratio of profits to sales (see Chart 11) as well as the ratio of profits to net worth or stockholders equity. We might look at the facts before commenting briefly on why these relations may be regarded as a normal resultant of reasonably self-evident forces.

According to Table 16, for the year 1954 as we move from an asset size of \$250,000 or under, the gross profit margin to sales amounted to just under 2% while for the largest firms, with an asset size of \$100,000,000 or over, the profit ratio climbs to close to 11%. Largely the same experience is disclosed for the other years, with the profit progression following much the same pattern. Similarly, Table 17 reveals about the same story for the 1945-1950 average and for 1954 and 1955.

Table 16. Ratios of Operating Profit to Sales, All Manufacturing Corporations, by Asset Size, 1951-1954

Asset Size (thousands of dollars)	Percent Operating Profit to Sales			
	1951	1952	1953	1954
Under \$250	3.7	: 3.5	: 2.6	: 1.9
\$250 - \$1,000	5.9	: 4.7	: 4.3	: 3.7
\$1,000 - \$5,000	7.9	: 6.4	: 5.3	: 4.6
\$5,000 - \$100,000	11.6	: 9.2	: 9.2	: 8.0
\$100,000 and over	14.2	: 11.4	: 11.4	: 10.9
		: :	: :	

Source: Economic Almanac (1956), pp. 285-286.

Likewise, the comparisons in terms of profits to equity capital in Table 13 climb in the same general way though there seem to be some slight irregularities in the 1947-1950 period, with the \$5-\$100 million asset size categories doing slightly better than the larger giant firms; the discrepancy, however, is rather small so that any number of special forces might have occasioned it. The relations, for 1955, appear in Chart 12.

That the ratio of profits to sales rises as asset size grows ought to occasion only mild surprise when it is apprehended that the larger firms use more equipment per dollar of sales, so that more of a capital return is required out of sales proceeds to meet their capital liabilities. There is also the fact that it is only the firms with larger asset size that can survive in heavy industry where unit turnover is slow and profit margins necessarily high, as for example, in the aircraft industry, locomotives, machinery and equipment, etc. The element of reduced competition and greater monopoly power, as well as experimental sales to Government for military needs, figure also in the explanatory realm. Further, the weight of size may give the firm market power to stipulate the price of things that it buys, affecting its profit position as compared to firms less favorably situated.

Chart 11

RATIOS OF OPERATING PROFIT TO SALES, ALL MANUFACTURING CORPORATIONS, BY ASSET SIZE, 1951 - 1954.

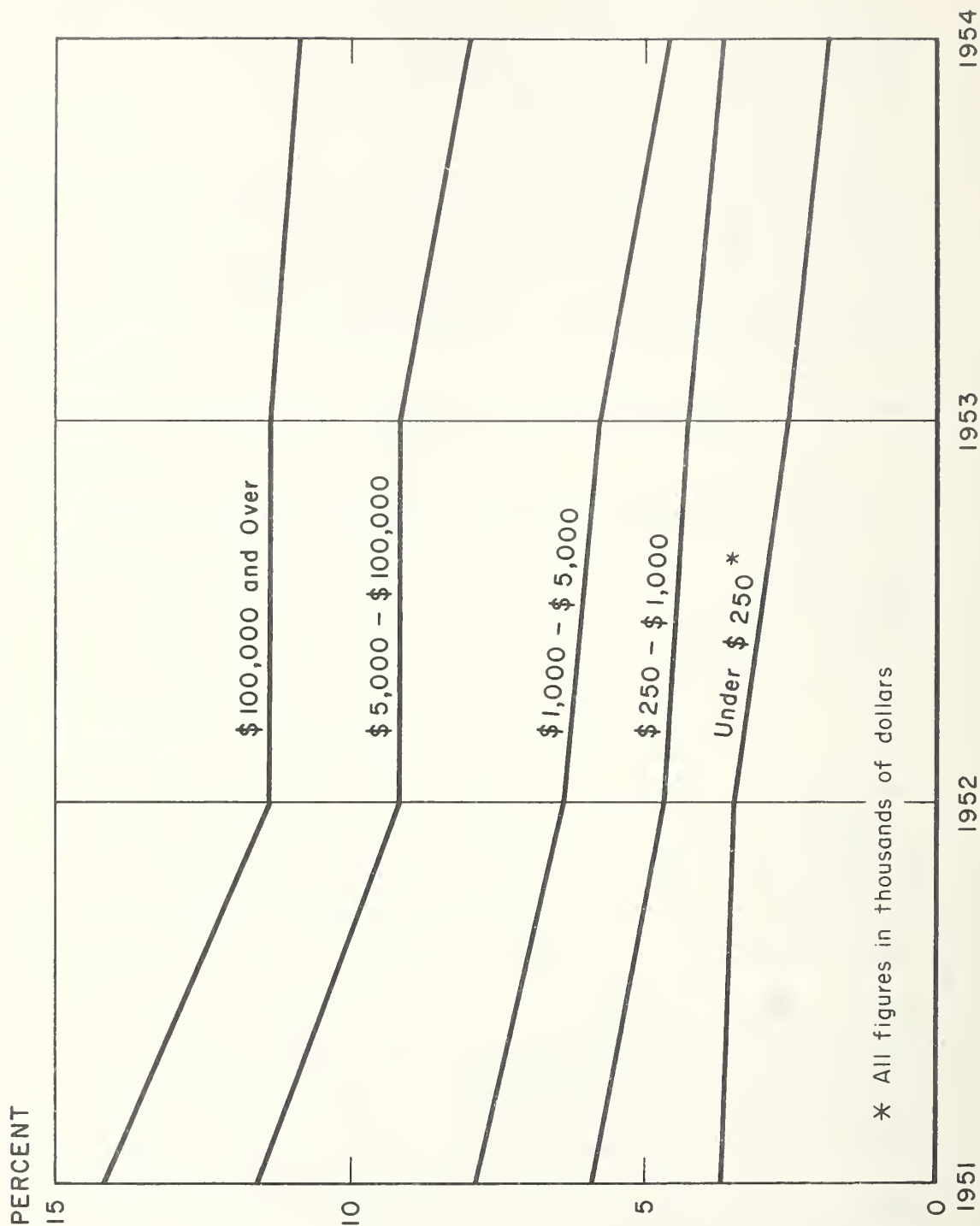


Chart 12

RATIO OF PROFITS BEFORE TAXES TO STOCKHOLDERS EQUITY,
BY ASSET SIZE CLASSES, 1955

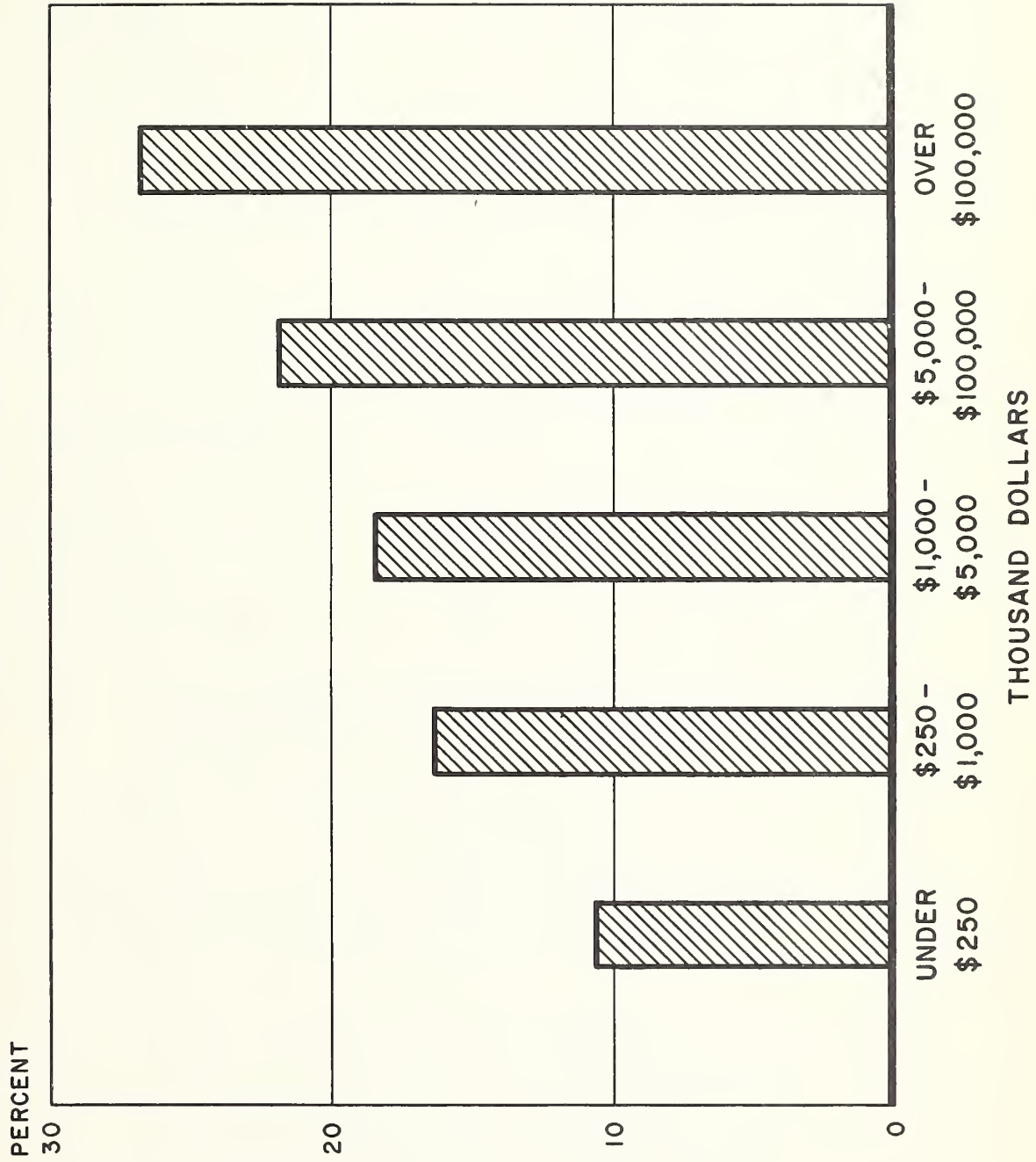


Table 17. Profits Before Federal Taxes in Cents Per Dollar of Sales, by Asset Size Class

Asset Size Class (thousands of dollars)	1947-1950 Average	1954	1955
Under 250	4.4	1.8	2.3
250-999	7.4	3.7	4.5
1,000-4,999	9.0	4.7	5.9
5,000-99,999	11.3	8.0	9.5
100,000 and over	13.2	11.3	13.5
All Asset Sizes	11.1	8.4	10.3

Source: Economic Report of the President (1956, 1957) (from Federal Trade Commission and Securities and Exchange Commission)

Table 18. Ratio of Profits Before Federal Taxes to Stockholders Equity, by Asset Size Classes

Asset Size Class (thousands of dollars)	1947-1950	1954	1955
Under 250	16.7	7.8	10.7
250-999	22.7	12.5	16.4
1,000-4,999	24.2	12.9	18.5
5,000-99,999	25.2	17.1	21.9
100,000 and over	24.9	20.7	26.8
All Asset Sizes	24.6	18.2	23.8

Source: Economic Report of the President (1956, 1957) (from Federal Trade Commission and Securities and Exchange Commission)

Profit Ratios in Expansions and Contractions

One further aspect of profit margins and profit ratios may well be developed in view of its bearing in conditions of price flux such as has marked the lumber industry since 1956. This is the behavior of profit margins in periods of general business expansion and contraction.

In Table 19 there are indicated the ratios of profits to sales (profits before and after taxes) in durable and nondurable goods industries in each of the identifiable periods of business expansion and contraction as isolated and classified by the methods of the National Bureau of Economic Research. Data are also provided on the ratio of profits, before and after taxes, to net worth.

Table 19. Producers of Durable vs. Producers of Nondurable Goods: Net Changes in Profit Ratios During Expansions and Contractions in General Business 1919-1949

	Ratio of Profits to Sales				Ratio of Profits to Net Worth			
	Before Taxes		After Taxes		Before Taxes		After Taxes	
	Durables	Nondurables	Durables	Nondurables	Durables	Nondurables	Durables	Nondurables
EXPANSIONS:								
1919-20a	-4.34	-3.03	-1.84	-2.17	-5.20	-7.14	-2.23	-5.15
1921-23a	8.33	4.50	8.31	4.59	9.93	6.30	9.44	6.42
1924-26c	1.49	.83	1.26	.74	2.91	1.62	2.47	1.45
1927-29	2.15	1.02	2.20	1.08	3.53	1.43	3.46	1.50
1932-37	23.87	5.95	22.54	5.52	17.96	8.63	15.96	7.66
1938-44	6.91	5.92	(.85)	1.27)	25.01	15.60	6.98	4.80
1946-48	4.34	-1.63	3.12	-1.00	14.23	-2.29	9.55	-1.38
CONTRACTIONS:								
1923-24c	-1.24	-1.22	-1.21	-1.14	-2.55	.04	-2.35	-.02
1926-27	-2.13	-.64	-1.88	-.57	-2.57	-1.01	-2.27	-.88
1920-21a	-6.55	-2.95	-5.76	-2.49	-9.41	-8.05	-7.85	-6.49
1929-32	-24.13	-7.39	-23.56	-7.11	-17.45	-9.88	-16.31	-9.26
1937-38	-4.86	-1.59	-4.25	-1.48	-8.22	-3.30	-7.00	-2.95
1944-46	-3.83	.58	(.18)	2.30)	-17.28	2.57	-3.33	5.88
1948-49	-1.18	-1.65	-.85	-1.06	-5.79	-6.23	-3.84	-3.97
a Epstein corporations.								

c Turnover and ratios of profits to worth are for Epstein corporations.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Corporate Earnings---Preliminary Draft, National Bureau of Economic Research, Table 12/Page 42.

What is immediately evident from this table is the fact that scarcely without exception (including the postwar experience when certain inflated profit margins failed to survive the transition) in a period of expansion all the profit ratios, before and after taxes, for durables and nondurables, and the ratios of profits to sales and net worth, rise; conversely, in periods of contraction the self-same ratios (with even lesser exception) are cut and reduced. The empirical rule then tends to be well maintained, to wit, that in expansions the profit ratios are in general enlarged and in contraction they are sliced.

Although it is not wholly accurate to identify the Bureau's classification of expansions and contractions with price upswings and downswings, further examination, it is believed, would disclose a fairly general association of the two, namely, that expansions usually involve an upward price wave, and during contraction, a price downswing.* On this premise we can draw the following inference, germane for price analysis, that profit margins tend as a rule to follow price movements rather closely, rising in a price upswing, and falling on the decline. Of course this would be expected so long as costs do not follow the price path perfectly, moving less than proportionately. This has been customarily true and is almost inevitable in view of the presence of fixed costs in the total outlay function of industry.

Conclusions

From this array of data, the following conclusions may be drawn:

1. Over the 32 year period, 1922-1953, profits before taxes to sales for durable goods corporations amounted to 7.7% and for nondurables, 6.2%. After taxes, the respective figures were 4.5% and 3.9%. On equity, before taxes they were 16.1% and 12.4%, and after taxes, 8.2% and 7.4%. The variability in the annual figures was greater in the case of durable than nondurable goods.
2. For trading corporations the figures were less variable over this period and generally smaller. The ratios of profits to sales, before and after taxes, were 2.6% and 1.6%, and to net worth, 12.2% and 5.3%.
3. In construction companies the corresponding figures, to sales, were 2.3% and 1.1%, and to net worth, 14.5% and 7.2%. Small ratios of profits to sales can thus leave adequate returns to equity.

* The recession of 1958 appears as an exception.

4. For public utilities the ratios to sales often exceeded 20% before taxes but to net worth the figures were closer to the industrial averages.
5. For 200 large manufacturing firms, over 1951 to 1956 the ratios of profits to sales (before taxes) ranged from 12.5% to 16.8%.
6. From 1942-1950, the average operating profit for listed manufacturing corporations appeared as 14.3%. The lumber and wood products industry, occupying about the middle of the range, showed a ratio of 11.7%.
7. For 1951-1954, for all manufacturing corporations the average operating profit was 9.3%. For lumber and wood products, again in about the middle of the range, the figure was 7.3%.
8. The evidence indicates that as the asset size grows, the ratio of operating profit to sales also increases. This seems to be accounted for primarily by the greater importance of equipment to labor in larger enterprises.
9. The data also indicate that almost invariably profit margins increase in cyclical upswings and fall back on down turns.

III. PROFIT RATIOS IN LUMBER AND COMPARABLE INDUSTRIES

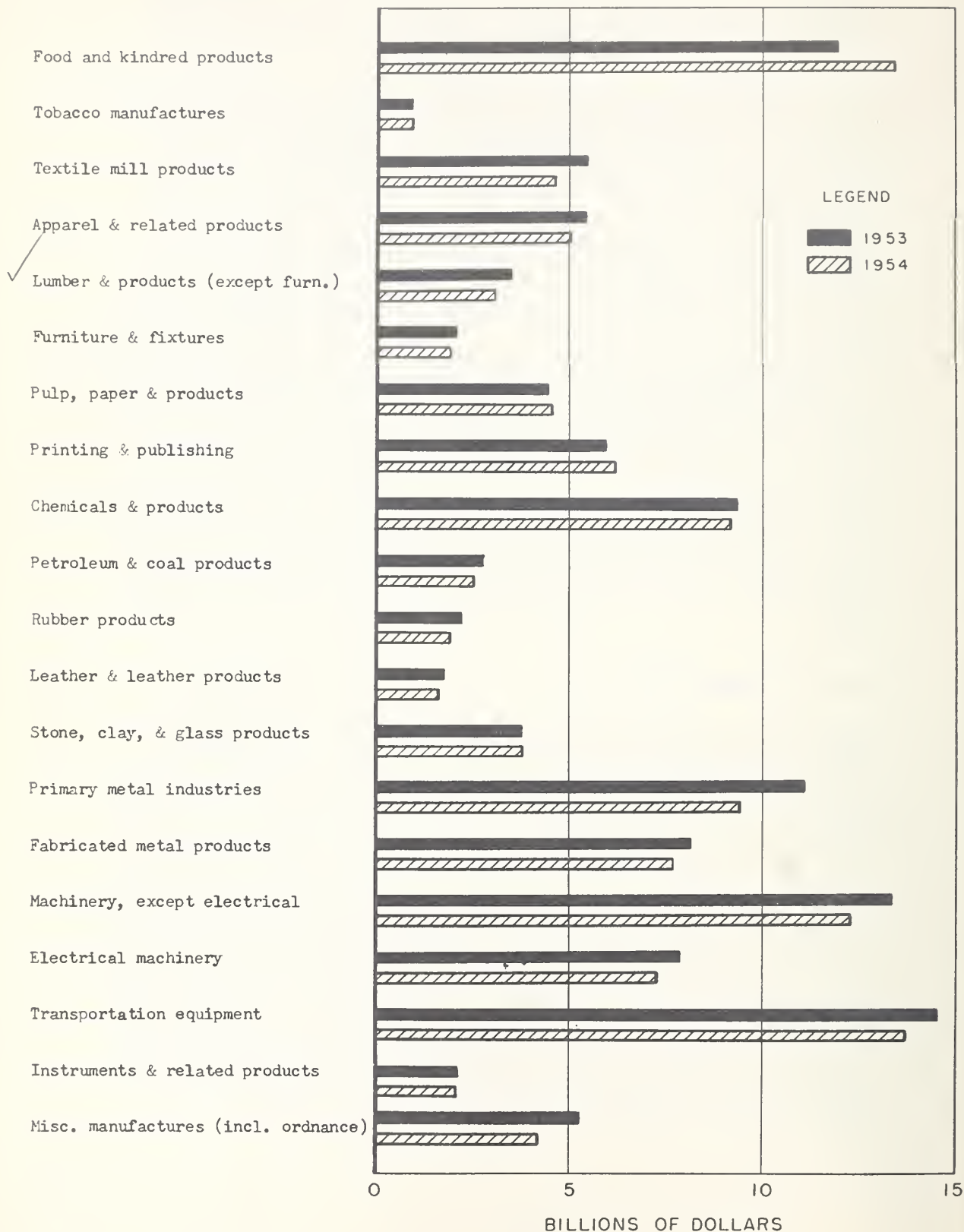
In any attempt to judge whether the profit ratios in lumber and wood products are in or out of line with other industries it is important to determine whether other industries are strictly comparable to the lumber products industry. Let us consider some aspects of this problem.

In the first place, the industries with which the profit results of the lumber industry ought to be compared are those which, in the eyes of lumbermen are comparable, in the sense of affording alternative outlets for investment and enterprise activity. These would be the industries to which these individuals would turn if profit opportunities currently, and prospects in lumbering for the future particularly, became unduly gloomy. Unfortunately, although this is the appropriate concept of comparability, it becomes useless operationally, from the standpoint of objective study, inasmuch as for almost every different individual the alternatives to his present line of endeavor might be quite different, depending on outlook, experience, temperament, location, contacts, and evaluation of growth potential. Thus we must abandon any attempt to consider the likely alternatives to lumbering in this fashion. The best we can do is to try to ascertain which industries are comparable in various objective dimensions, and examine how the profit ratios experienced in these lines shape up with the results which emerge in the lumbering field. This will be the task of this section. While no single bit of data by itself is fully indicative, the total examination might reveal various vital respects in which there exists some comparability with the structure of the lumber and wood products field.

Clues to Comparability

One important sign of comparability indices would be the Value Added by Manufacture for Major Industry Groups. Data for the period 1949-1954 appear in the Appendix. Chart 13 presents the data graphically for the years 1953 and 1954. According to this information the value added by Lumber and Lumber Products, from 1950 on, excluding furniture, ranged from \$3 billion to \$3.5 billion. In this respect, in terms of output contribution, the industries most comparable were the Textile Mill Products, with a value added of almost \$5 billion, Apparel and related products, of nearly the same size, of Pulp, Paper and Products, in the neighborhood of \$4 to \$4.5 billion, of Petroleum and Coal Products running somewhat smaller (\$2.5 to \$2.8 billion), of Stone, Clay, and Glass Products in the neighborhood of \$3.5 to \$3.8 billion. From the standpoint of value added, therefore, the most nearly comparable industry grouping to the Lumber and Products is the Stone, Clay, and Glass Products industry. Next would be that of Pulp, Paper, and Products.

Chart 13
VALUE ADDED BY MANUFACTURE FOR
MAJOR INDUSTRY GROUPS, 1953-1954



Examining figures on average employment, in Lumber and Lumber Products the average number of employees ranged from about 350,000 to about 770,000 in the 1951-1954 period. (See Appendix). In this dimension, Printing and Publishing, with 760,000 to 800,000 seems most nearly comparable, along with Chemicals and Chemical products, which gave employment to some 700,000 to 770,000.

Looking at the total wage and salary bill, in Lumber and Lumber products this amounted to about \$2 billion. In this dimension, with only about 2/3 the number of employees, only Pulp, Paper, and Products appears comparable. (See Chart 14).

In terms of capital invested (see Appendix) the figures for the Lumber and Wood Products classification indicate a total of from \$3 to \$3.3 billion in the 1948-1952 period. Apparel and Fabric Products and Paper and Allied Products run slightly higher (see Chart 15) while Printing and Publishing ranges from \$1 to \$1.5 billion greater. Stone, Clay and Glass Products investment value was at about \$3.2 to \$3.8 billion. All of the rest of the industrial categories are a good deal higher and, in this dimension, scarcely comparable. Tobacco Manufactures Leather and Products, and Rubber Products, seem to be the only groupings that generally run smaller in terms of Capital Invested.

Examining the data on Total Assets from 1951 to 1954 (see Appendix and Chart 16), the relationships are approximately the same. Lumber and Wood Product asset totals run from some \$3.3 to \$3.6 billion. Apparel and Finished Textiles seem to involve asset totals of some \$500 million to \$1 billion smaller while Printing and Publishing, in the later years, approximates the size of the Lumber and Wood Products classification. Stone, Clay and Glass Products approximate an asset total of some \$5 billion. Rubber Products seem to hover about the \$3 billion asset total. For the rest, the spread is either higher or lower, failing to suggest any ready comparability, in asset size, with the Lumber and Wood Product grouping.

In terms of Capital Invested Per Production Worker over 1948-1952 (see Appendix) the figures for the Lumber and Wood Products class amount to some \$5,000 to \$5,700. Textiles and their Products, which combine both the Textile-Mill and the Apparel and Fabric Products sectors, seem to approximate this performance, as does the Furniture and Fixtures category. Practically all the other classifications run higher, with the sole exception being the Leather and Leather Products classification, where the total is in the neighborhood of \$4,250. This information on "capital-intensity" (for 1952) appears in Chart 17.

Chart 14

EMPLOYMENT AND WAGES IN MANUFACTURING INDUSTRIES, 1954

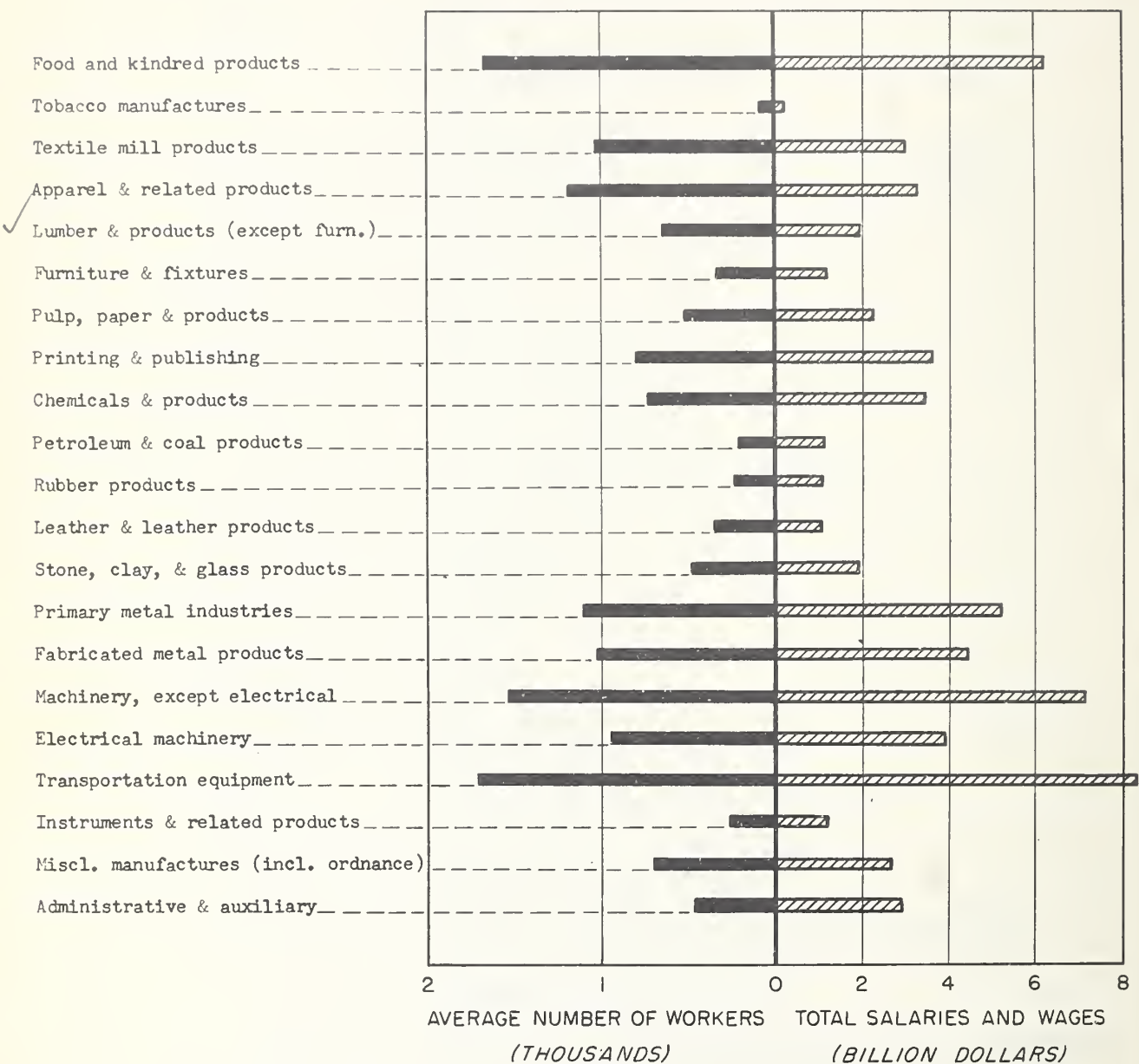


Chart 15
CAPITAL INVESTED, CORPORATE MANUFACTURING, 1952



Chart 16

TOTAL ASSETS OF ALL MANUFACTURING CORPORATIONS,
BY INDUSTRY, DECEMBER 1954

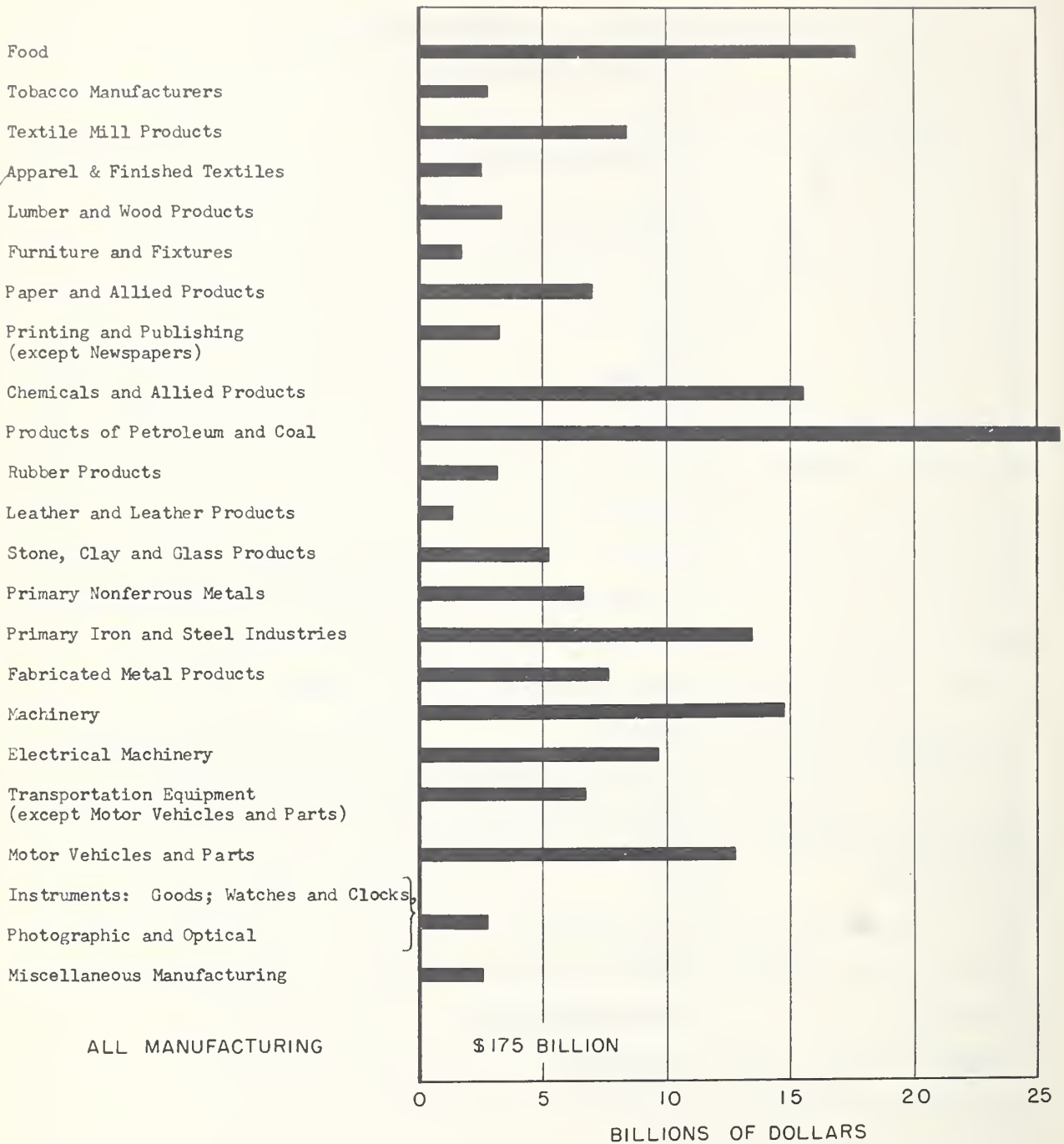
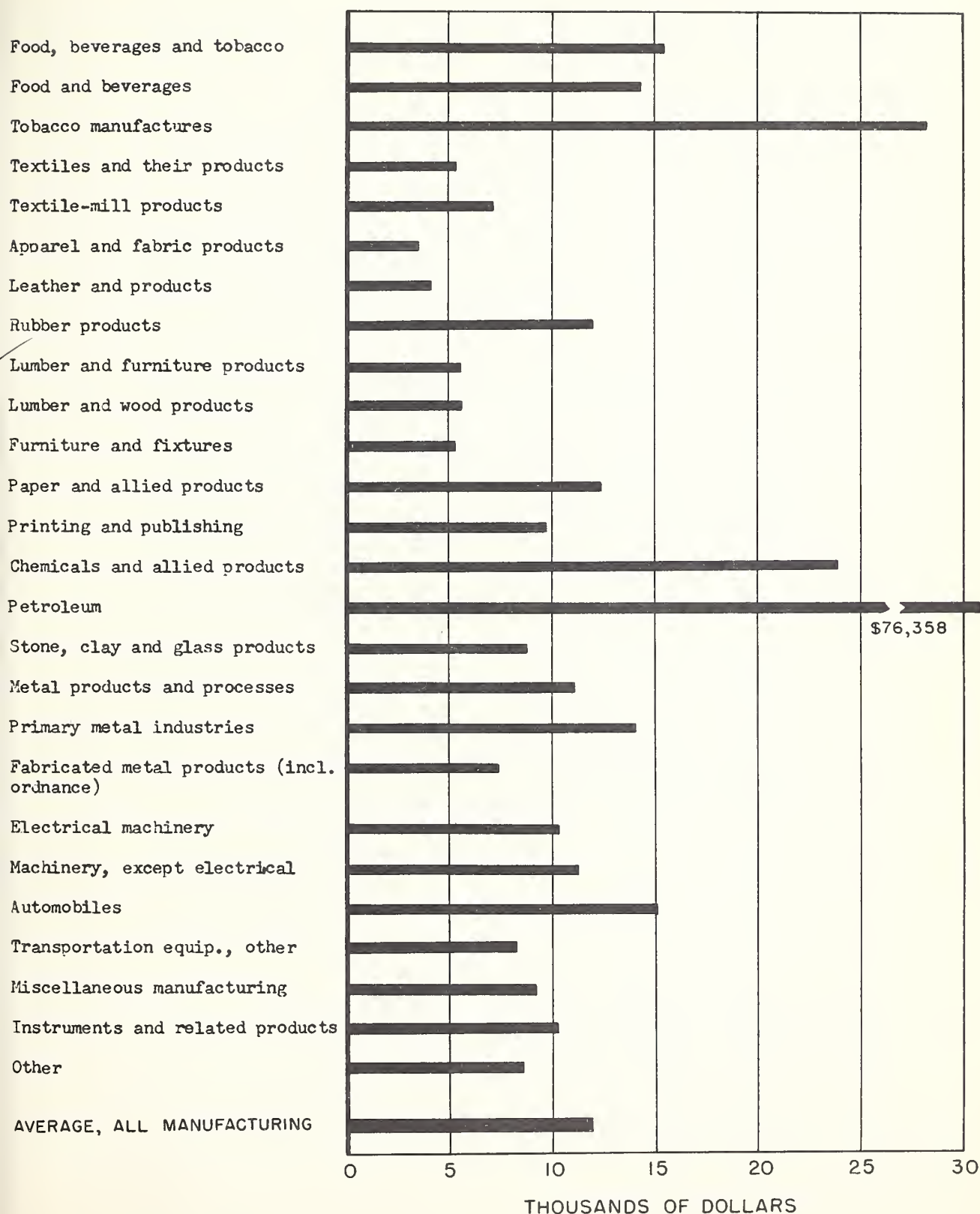


Chart 17

CAPITAL INVESTED PER PRODUCTION WORKER, ALL MANUFACTURING INDUSTRIES, 1952



Similarly, in terms of labor costs as a percent of the value of sales, for Lumber and Basic Timber Products the ratio runs from about 24% to 28%. (See Appendix and Chart 18) In this respect Printing, Publishing, and Allied Industries, run about 24% while Stone, Clay and Glass Products are at about 25%. Certain of the "heavy" industries, as Electrical Machinery and Iron and Steel, also show about the same levels. The data, it may be noted, covers an earlier period, 1941 to 1945.

In terms of employment, of production and related employees over 1947-1956 (see Appendix), the Lumber and Wood Products totals were at about 750,000 employees in the early postwar years to about 670,000 in more recent years. Stone, Clay and Glass Products employment is smaller, involving some 450,000 to some 470,000 employees. Curiously, it is the Automobile Industry which seems closest to the Lumber and Wood Products total when measured by the index of employment totals. In 1956 some 650,000 were so employed, compared to the 670,000 figure for Lumber and Wood Products. (See Chart 19)

Inventories held would be one of the less significant indicators from the standpoint of the comparability of profit ratios. These might be held for a variety of reasons, chief among which are the possibilities of speculative gains on rising markets and a reflex, on the other hand, of the failure of sales to keep up with the production pace. The Lumber and Wood Products total, for the years 1951 to 1954, amounted to some \$750 to \$850 millions. (See Appendix) Stone, Clay, and Glass Products alone seem comparable in this respect though even here they ranged higher, involving totals of over \$850 to \$900 million.

According to the data on investment outlays on Plant and Equipment covering the period 1951 to 1955, the total of such new investment expenditure in Lumber and Wood Products came to some \$1.1 million. Very close to this in size was the figure for Printing and Publishing Industries. Next was the \$1.5 total for Textile Mill Products and then some \$1.7 billion for Stone, Clay and Glass Products, with a slightly larger sum in Electrical Machinery. The rest of the totals seem at a good remove from that for Lumber. Interestingly, there seems to have been little or no new investment in either Tobacco Manufactures or Leather and Leather Products, a patent contract with presumed portents of profitability for Lumber and Wood Products firms. (See Appendix and Chart 20)

Figures on net earnings reflect, of course, the final profit results of the ratio of profits to sales. (See Appendix and Chart 21) Judged on this basis, with net earnings visualized as a rate of return on invested capital over the 1948 to 1952 period the percentage for Lumber and Wood Products ranged from just under 6% in 1952 to almost 13% in 1948, averaging out to slightly over 9%. Paper and Allied products are roughly

Chart 18

LABOR COSTS AS A PERCENT OF SALES IN MANUFACTURING, 1945

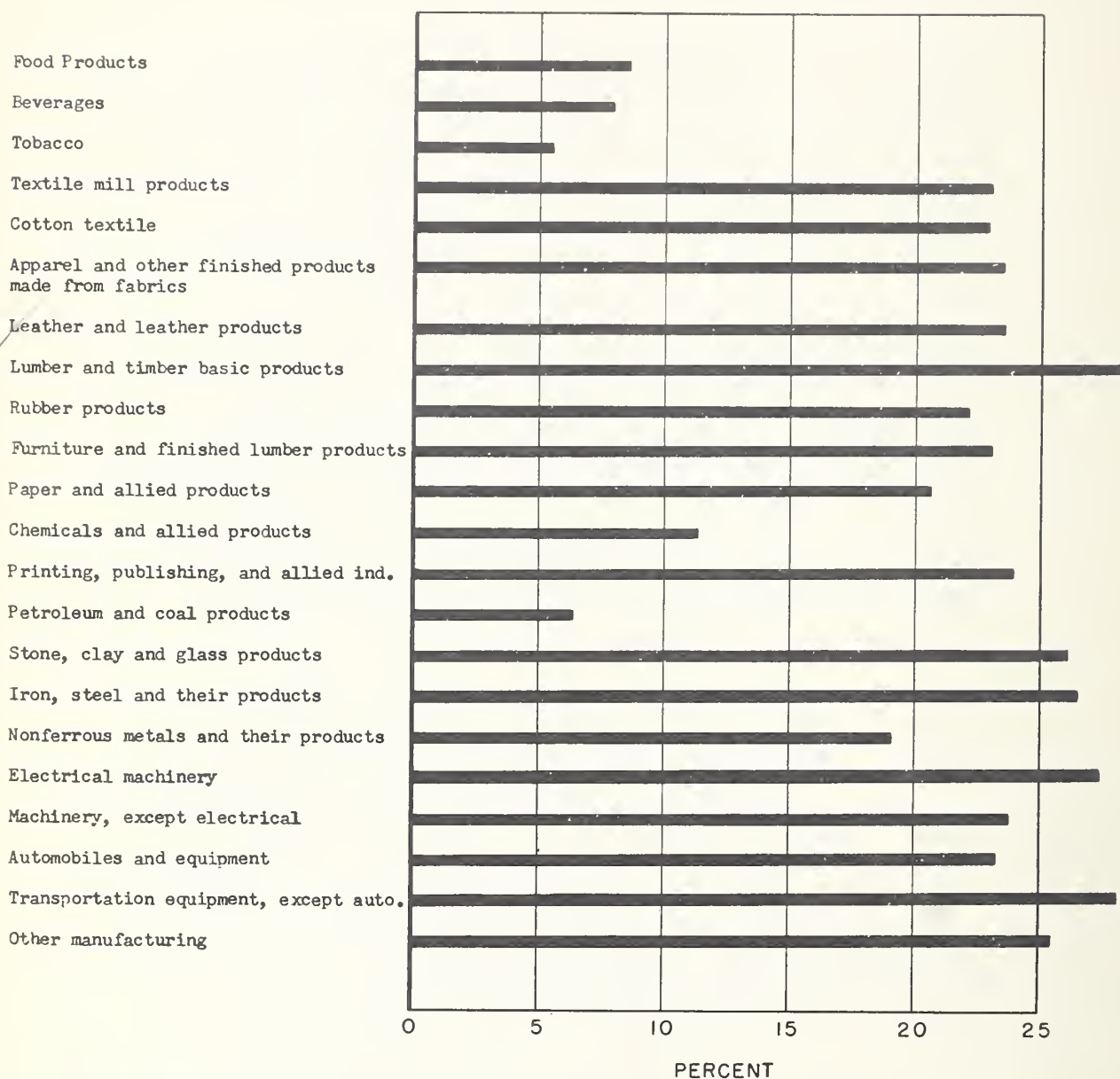


Chart 19

EMPLOYMENT OF PRODUCTION AND RELATED WORKERS
IN MANUFACTURING INDUSTRIES, 1955-1956

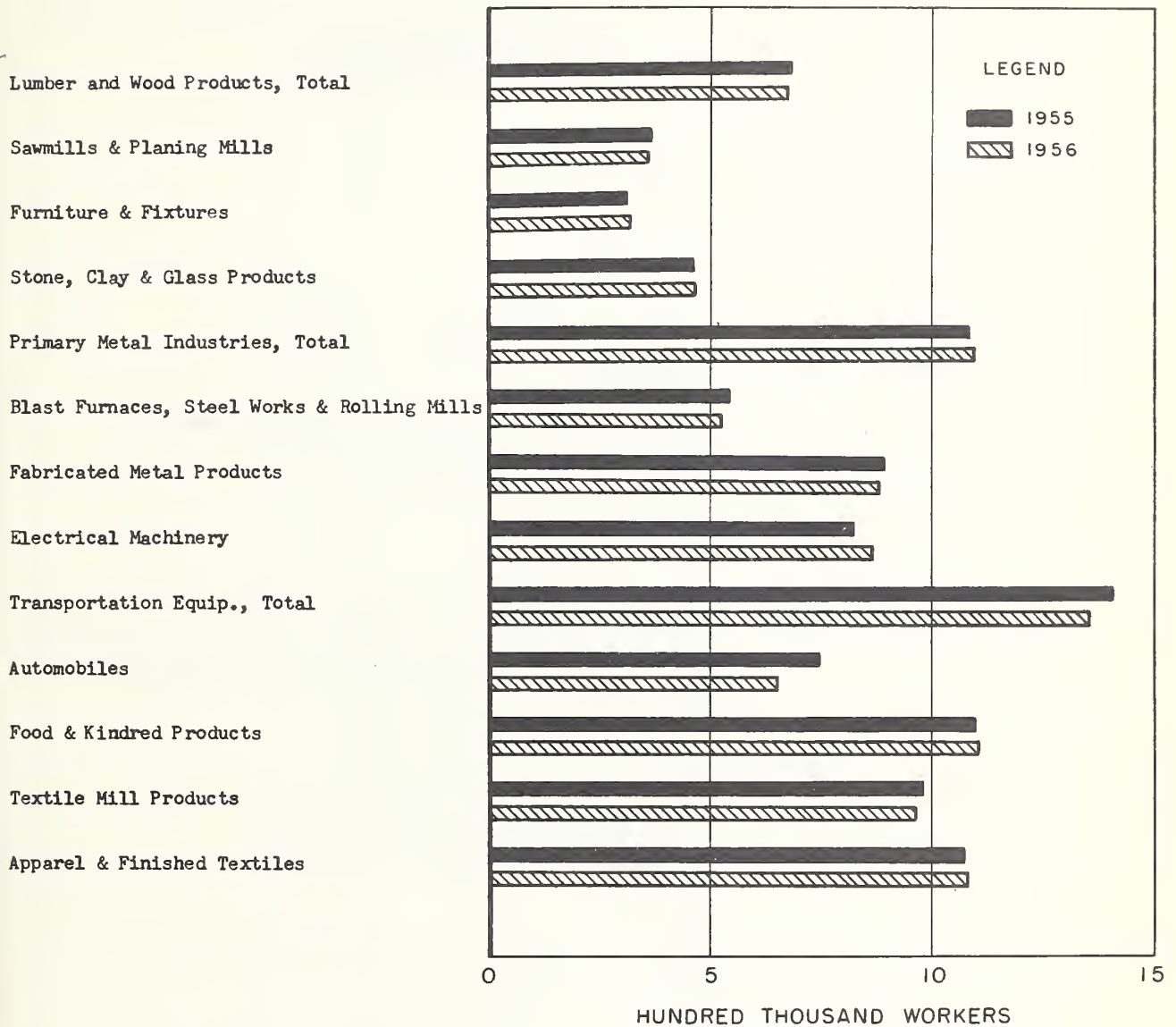


Chart 20

TOTAL MANUFACTURERS' EXPENDITURES FOR NEW PLANT AND
NEW EQUIPMENT, BY MAJOR INDUSTRY GROUPS, 1951-1955

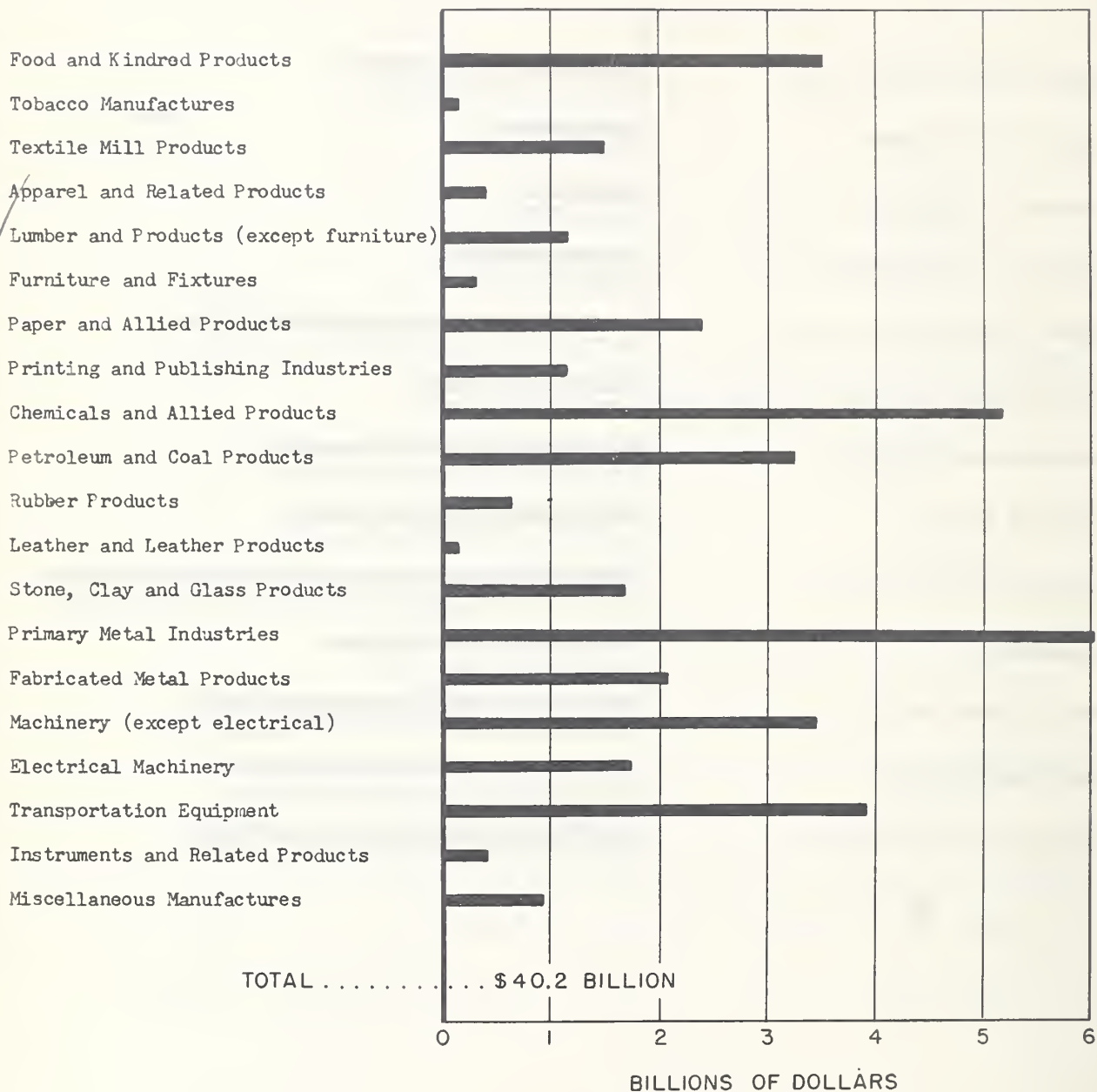
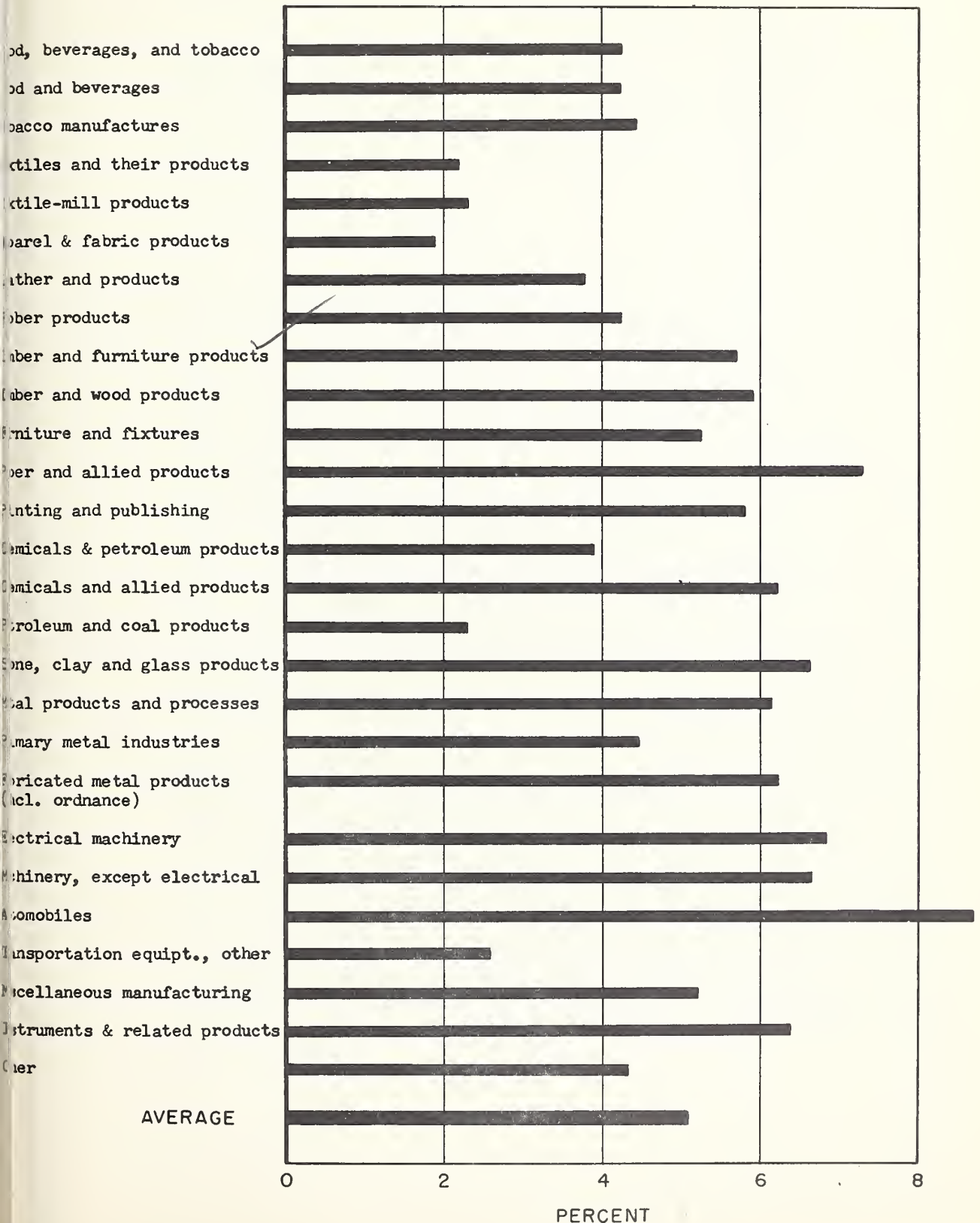


Chart 21

NET EARNINGS IN CORPORATE MANUFACTURING,
PERCENT OF CAPITAL INVESTED, 1952





comparable here, while Stone, Clay and Glass Products approximated just under 10% for this period. Metal Products and Processes were not far from these results, and the same also seems to be true of certain of the subtotals in the heavy industry categories (such as Electrical Machinery, and Machinery).

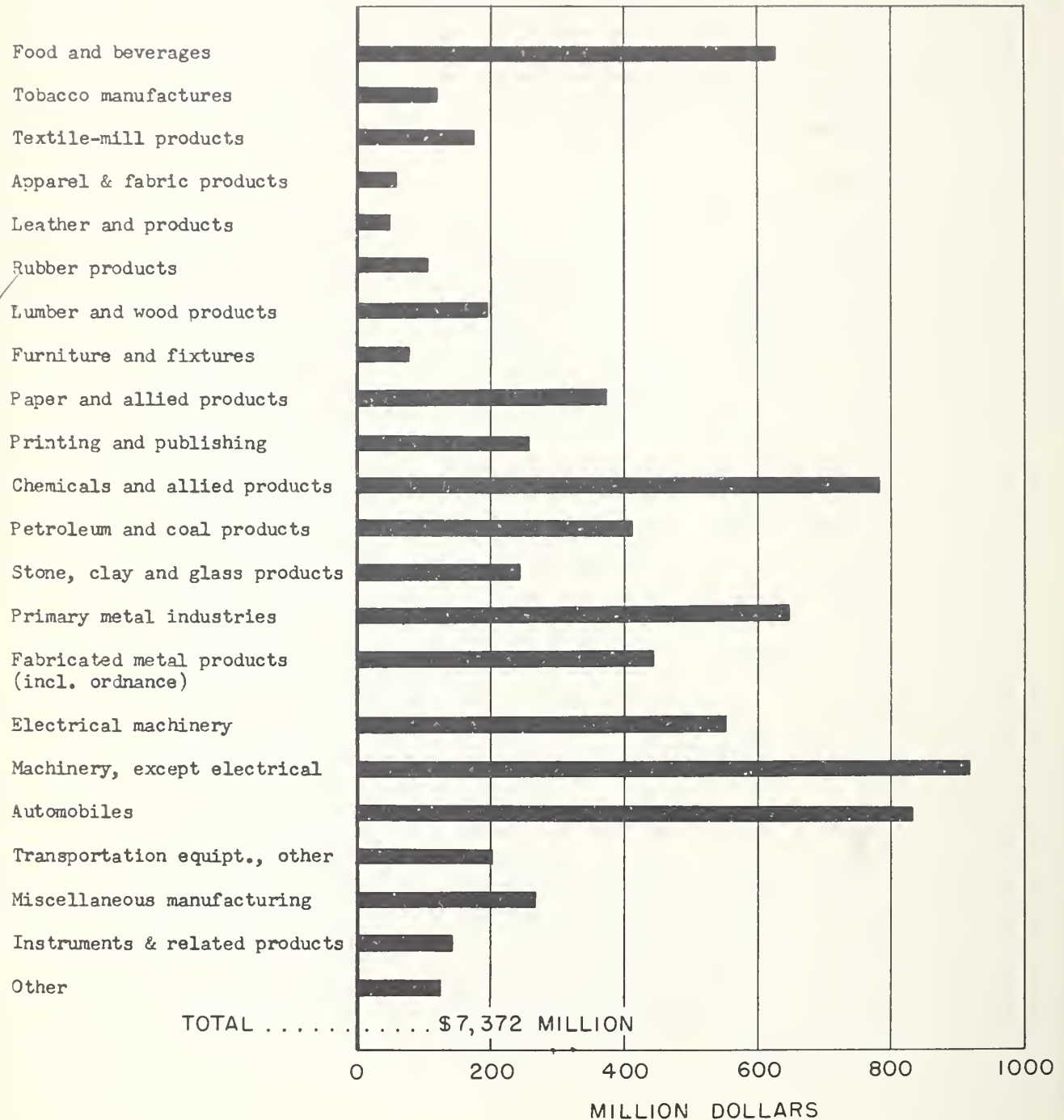
In terms of net earnings over the years 1950 to 1952 the Lumber and Wood Products totals amounted to about \$200 to \$400 million. The Stone, Clay and Glass Products data show a closely equivalent amplitude, amounting to some \$250 to \$415 million. Other totals appear less clearly similar when measured in terms of the profit aggregate. (See Appendix and Chart 22)

Inferences on Comparability

Reading back over this array of evidence, the Stone, Clay and Glass Products, and Pulp, Paper and Products, industries seem most comparable to Lumber and Products judged in terms of Value Added. In terms of employees, Printing and Publishing, Chemical Products, and Stone, Clay and Glass Products seem most comparable though in terms of the salary and wage total, Pulp, Paper and Products, though with almost a third fewer employees, and Stone, Clay and Glass Products, approximated the Lumber figures. In terms of capital invested, Apparel and Fabric Products, and Stone, Clay and Glass Products, alone seem comparable. Printing and Publishing, and Stone, Clay and Glass Products are close to the Lumber industry, along with Rubber Products, in terms of total assets in 1954. Textiles, and Furniture and Fixtures, are closest from the standpoint of capital invested per production worker; Leather and Leather Products might also be included. Other than Stone, Clay and Glass Products, and certain of the durable goods industries, there seems little comparability in the figures for the ratio of labor costs to sales, where the data refer to the war years. In terms of employment, it is the automobile industry that is closest to the Lumber and Wood Products classification, with Stone, Clay and Glass Products quite smaller. With respect to the size of inventories, in the years 1951-1954 it is the Stone, Clay and Glass Products category which is again closest to the Lumber industry. In new investment, Printing and Publishing, Textile Mill Products, and Stone, Clay and Glass Products, are most like the Lumber industry. Measured by net earnings as a rate of return, Paper and Allied Products appear comparable, along with Stone, Clay and Glass Products, and Metal Products and Processes. In net earnings (as an absolute total) the Stone, Clay and Glass Products total was most nearly similar to that for Lumber and Wood Products.

Chart 22

NET EARNINGS IN CORPORATE MANUFACTURING, 1952



Scrutinized from all of these standpoints, Stone, Clay and Glass Products, along with Printing and Publishing, Textile Mill Products, and perhaps Furniture and Fixtures, Leather and Leather Products, and possibly Rubber Products, appear as most nearly comparable to the Lumber and Wood Products group.

Profit Ratios in Comparable Industries

Using the data from the larger tables on profit-sales ratios, when we list the industries that appear most nearly comparable to the Lumber and Wood Products economy the results emerge as in Tables 20 and 21. According to Table 20 the Lumber and Wood Products classification fared, in the 1946-1950 period, as well as or better than any of the other four with the exception of Textile Mill Products and, in two of the five years, Printing and Publishing.

Table 20. Profit-Sales Ratios in Selected Industries, 1942-1950

<u>Industry</u>	<u>1942</u>	<u>1943</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>	<u>1947</u>	<u>1948</u>	<u>1949</u>	<u>1950</u>
Leather and									
Leather Products	9.9 :	10.6 :	8.3 :	7.7 :	6.5 :	9.5 :	6.9 :	4.6 :	7.3
Printing and	:	:	:	:	:	:	:	:	:
Publishing	10.7 :	15.2 :	16.9 :	17.3 :	14.3 :	12.4 :	10.9 :	9.6 :	10.1
Textile Mill	:	:	:	:	:	:	:	:	:
Products	14.1 :	13.0 :	13.1 :	12.7 :	16.3 :	16.0 :	17.5 :	10.2 :	14.4
Rubber	:	:	:	:	:	:	:	:	:
Products	11.4 :	11.5 :	10.7 :	9.8 :	11.3 :	8.3 :	8.6 :	6.4 :	11.6
Lumber and Wood	:	:	:	:	:	:	:	:	:
Products	13.3 :	10.9 :	12.5 :	11.6 :	11.3 :	13.6 :	11.9 :	8.4 :	11.5

Source: See Appendix.

Examining Table 21, of the seven industries listed, the Lumber and Wood Products profit-sales ratio falls consistently behind that of the Stone, Clay and Glass Products and the Rubber Products classification. The respective four year averages are 14.8%, 9.7% and 7.3% for Lumber Products. If the Stone, Clay and Glass Products category is the most nearly comparable, its profit-sales ratio was, over the period considered, more than double that of the lumber industry.

Table 21. Profit-Sales Ratios in Selected Industries, 1951-1954

<u>Industry</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>
Textile Mill Products	8.5 :	4.6 :	5.2 :	3.1
Furniture and Fixtures	7.6 :	6.2 :	6.1 :	4.8
Printing and Publishing	7.4 :	6.8 :	6.8 :	6.3
Rubber Products	12.0 :	9.5 :	9.0 :	8.1
Leather and Leather Products	3.1 :	3.9 :	4.0 :	4.4
Stone, Clay and Glass Products	16.9 :	14.1 :	14.1 :	14.0
Lumber and Wood Products	10.4 :	7.0 :	5.9 :	5.8

Source: See Appendix.

Some Fragmentary Data on Profit Ratios in the Lumber Industry

It has already been indicated that available data on profits of lumber firms is scanty and the hope has been expressed that in the future steps will be taken to improve this flow of information. The following tables, however, collate some of the profit results derived from various sources.

According to Table 22, from records of the Internal Revenue Service which includes only the very largest firms, the profit-sales ratios were almost astronomically high. It is not clear as to the nature of the deductions contained in the item "Cost of Goods Sold," particularly whether depreciation and other recognized expenses were deducted. While the figures are presented as received, no particular weight is assigned them as they fail to confirm other data derived independently.

Table 22. Selected Corporations Engaged in Lumbering

<u>Item</u>	<u>1955</u>	
Number of Returns	20	15
Gross Sales (\$000)	\$179,297	\$123,171
Cost of Goods Sold (\$000)	116,205	84,686
Gross Profit	63,092	38,485
Ratio of Profit to Sales	35.2%	31.2%

Source: Tabulation provided by Statistics Division, Internal Revenue Service, from unpublished records of data from income tax returns.

More informative for our purposes are the ratios contained in Table 23, covering some 21 Lumber and Wood Products firms over the period 1954-1957.* As would be expected the range of variability is rather large, running from substantial losses to large operating profits. About half of the firms generally had a ratio of profits to sales of under 10%. Profits to sales, for all 16 reporting firms were positive in 1955; in 1956, 2 of 20 reporting firms showed losses. For all 3 firms for which 1957 data was available, a fall in the profit-sales ratio was indicated.

* Several other income statements were received covering subsidiary firms in larger integrated companies. In the time available it was not possible to analyze these with the necessary care and so, for this report, they have not been included.

Table 23

Ratios of Profits to Sales for 21 Lumber and Wood Products Firms
1954-1957

Firm No.	1954	1955	1956	1957
1	9.0	10.7	9.1	---
2	21.8	28.9	16.8	---
3	4.6	13.0	15.3	---
4	---	6.8	.9	---
5	---	---	6.0	---
6	---	19.8	17.9	---
7	4.6	10.7	9.5	---
8	33.7	21.7	18.5	---
9	---	---	9.7	---
10	---	---	-16.5	---
11	---	---	13.4	---
12	3.2	2.8	5.7	---
13	-24.4	6.4	4.2	---
14	---	---	8.9	4.5
15	2.1	12.9	---	---
16	22.3	24.5	23.5	19.5
17	---	4.4	4.3	2.9
18	---	4.1	4.6	---
19	8.7	6.7	6.3	---
20	-2.7	1.2	14.7	---
21	---	7.9	6.7	---

Source: Income Statements received from individual firms by Division of Timber Management, Forest Service. Firms numbered to conceal identity.

For three firms, denoted as A, B, C, there is similar information extending back to 1947. Tabulated, the results appear as shown in Table 24, with one ratio hovering close to a constant industrial average, another--a large firm--well above the usual norms, and the C firm being quite erratic in its returns.

Table 24. Ratios of Profits to Sales for 3
Lumber and Wood Products Firms, 1947-1953

Firm	1947	1948	1949	1950	1951	1952	1953
A	12.2	13.8	10.2	12.8	13.1	10.0	9.4
B	----	25.6	19.8	23.9	13.1	24.3	22.0
C	2.7	6.1	(-17.7)	14.6	28.0	4.2	-1.3

If the original sales and profit data underlying Table 23 are aggregated, the average profit to sales ratios that emerge are as follows: 1954, for 11 firms 19.9%; 1955, for 16 firms, 19.6%; 1956, for 20 firms, 17.5%. While these ratios are on the high side they are undoubtedly distorted by the presence of a few large firms with unusually large profit ratios, and thus able to dominate the final outcome in the small sample we currently possess. To illustrate, in 1955 just four firms with profit ratios at or above 20% accounted for \$1,530 million of the total of \$1,767 million of sales proceeds.

In sum, the earlier remark may be repeated, that information on profits and profit-sales ratios for lumber firms in general, and for those firms wholly or strongly dependent on Forest Service stumpage, is manifestly deficient. Steps to remedy this shortcoming might be a prime objective of the research and price policy staffs of the Forest Service.

Profit Ratios Used in Forest Service Appraisals

In the light of the examination of profit ratios just concluded, we might take a moment to examine the ratios used in Forest Service appraisals. In Table 25, the profit to sales ratios used in Regions 3, 5, and 6 over the years 1953-1958 are presented. In Region 3 the ratio averages out to nearly 11% for this period. In Region 5 on the West Side, the 11% average seems to have ruled; on the East Side the average result seems to be a shade lower. In Region 6 the combined average on East and West Side is closer to 9-1/2%. While an explanation of the reasons for changes in these ratios would involve a study in itself, on an overall view they conform to what we might have expected from data derived from other sources.*

* It might be borne in mind that these ratios refer to appraisals based on some "average" concept, rather than to actual or realized profits--as are shown in the other tables of this section. See below Part VI.

Table 25. Approximate Profit Ratios Used in Forest Service Appraisals
Region 3, 5, and 6; (1953-1958)

Year	Region 3		Region 5			Region 6		
	Profit to Sales		Profit to Sales			Profit to Sales		
			Pine		W. Fir	D. Fir	East Side	West Side
			East Side	West Side				
1953	: 10.7	:	10.7	: 12.3	: 10.7	: 10.7	: 10.7	: 10.7
1954	: 11.1	:	11.5	: 13.0	: 9.1	: 10.7	: 10.7	: 10.7
1955	: 10.9	:	11.5	: 13.0	: 7.4	: 9.1	: 9.9	: 6.9
1956	: 11.1	:	10.7	: 13.8	: 9.9	: 13.0	: 9.5	: 6.2
1957	: 10.7	:	8.3	: 12.3	: 9.9	: 12.3	: 9.0	: 8.3
1958	: 10.7	:	10.7	: 10.7	: 10.7	: 10.7	: 10.3	: 10.3
Average	:	:		:	:	:	:	:
1953-1958	: 10.9	:	10.6	: 12.5	: 9.6	: 11.1	: 10.0	: 8.9

IV. STUMPAGE PRICE DETERMINATION AND APPRAISAL IMPLICATIONS

It has already been argued that stumpage value provides an illustration of the principle of derived demand, where the only reason for the importance of the ingredient--stumpage--is due to the importance of the final products to which it contributes. Like all cases of derived demand, the only way in which it is possible to determine the value or economic importance of one of the inputs is on the proviso that information is available, either in the market or in the businessman's estimate, on the prices of other factors of production.*

Let us consider the implications of this for determining stumpage values and, indirectly, for both bid analysis and for stumpage appraisals. According to the usual principles of input price-determination, if we can obtain an estimate of the selling price of the final products fabricated from the standing timber then, by deducting the direct costs of processing, and thereafter some estimate of necessary--and normal--overheads, including profits, the residual would constitute the maximum stumpage allowance (per MBF). To derive the total stumpage value involves, of course, merely multiplying the unit stumpage by the number of units involved.

This is the theory of stumpage prices in skeleton form. To develop the pure theory, we ought to examine each of its key assumptions at some length.

One further prefatory remark is not amiss. What we seek in a theory of stumpage value is some indication of the forces determining the maximum economic value of a timber stand and thus, the factors which tend to explain its price. Of course, the economic value of stumpage will not coincide with an appraisal price so long as the objective of appraisal is different, i.e., an appraisal is ordinarily not directed to prejudging maximum value or to ascertaining the utmost that could be paid by the most efficient firm pondering the utilization of the timber. Furthermore, unless an appraiser--or an economist--had all the information** available to all the participants valuing the timber stand, he could hardly predict the maximum economic value

* For a statement of the theory, see my Approach to the Theory of Income Distribution (Chilton and Company, Philadelphia, 1958), Chapter I.

** Even more information would have to be available to the appraiser or observing economist, for bidders act on the basis of forecasts; the imputed importance of stumpage, on the other hand, would also be dependent on actual results. Thus, not only would the observer have to peer into the minds of buyers but would also have to know the ultimate outcome of market price and cost phenomena. All this indicates, perhaps, the futility of attempting, through appraisal, to secure maximum stumpage value.

of stumpage. Hence, to repeat, the following pages do not purport to be a theory of appraisal but instead, a statement of the diverse factors, of major or incidental importance, influencing stumpage price determination. Manifestly, the analysis will have some bearing on appraisal techniques whenever it reveals some important forces influencing stumpage values which might otherwise be overlooked; likewise, an understanding of the theory of maximum stumpage value can conceivably be useful in interpreting bid experience. For these reasons the theoretical preoccupation is not entirely a digression; it has its application in one direction or the other.

Expected End-Product Prices

Unless final product prices have been and are expected to be stationary, or something like wartime price control exists, the price that would go into any businessman's statement of an end-product price for stumpage valuation must be an expected price rather than an already known past price. This has some overtones for appraisal for it does signify that only when past conditions have been stable, and are expected to be such in the future, a utilization of past price data will be at least partially inaccurate and can at best serve as a guide to future prices. An extrapolation of past prices will understate the end-product prices on which stumpage is ultimately estimated when prices are expected to rise and overstate stumpage values in a market expected to be heavy and falling.

As an estimate of the economic value of a productive factor must depend on the price its product will sell for when it reaches the market, and thus embodies a forward-looking view, subjectivism enters into an economic valuation (or an imputed value, as the economist would term it) from start to finish. So much will thus depend upon the psychology, foresight, shrewdness, and acumen, of the individual making the forecast. There is no reason to expect that different individuals, charged with the same responsibility and given the same data, will reach the same forecast: different individuals in different lumbering firms and even different individuals within the same firm, may hold different surmises on the future price. This is a difficulty in evaluating the economic importance of a productive factor even under the most favorable circumstances, when complicating factors are held to a minimum. What are its implications for appraisal analysis? It implies that inevitably, so far as lumber prices go, there is a partially arbitrary judgment involved in making the appraisal, one on which reasonable individuals might always differ. Differences are likely to be small and insignificant in stable circumstances when practically no change in price is expected over time. Disagreement is likely to be most acute during periods in which greater change, of unknown dimensions, is expected. The appraisal hypothesis of assuming that the past price will hold into the future

projects the known into the unknown, as if the fact of recent existence ensures its perpetuation. The hypothesis will be most erroneous when the pace of price advance or decline is accelerating.

In an enterprise economy, where valuable resources are available to all potential bidders, the productive factor will tend ordinarily to be commandeered by the firm with the most favorable ratio between prices and costs. With cost phenomena the same between firms, the firm whose purchasing agent holds the most optimistic views on the future of price movements will tend to be the successful bidder. This is not to suggest that his views will ultimately prove to be the correct ones, but only that he will be willing to offer most for the resource. It is only "over time" that we must suppose him to be most nearly correct, for the supposition is that by guessing wrong and committing frequent mistakes he will either disappear from the field or show smaller profits than competitors: thus survival, in a way, testifies to the correctness of past guesses.

Product Diversity and Stumpage Value

Next, any writing in of an end-product price which assumes that all of the stumpage will end up as surfaced dry lumber must contribute to some inaccuracy between the appraisal and the full economic value of stumpage. To assume that there is only one use, or one end-product, is not any more realistic than to appraise all land in Illinois on the supposition that it can be used only to grow corn, or that all land in Nebraska is destined for use as wheat land. While this assumption will "generally" be valid it is not a universal or wholly accurate hypothesis.

This proposition has several ramifications. It implies, for example, that if a stand of timber is likely to be processed by the prospective buyer to a form other than surfaced dry lumber, then this alternate product type provides the appropriate end-product price determining the full economic value of the stumpage and, presumably, it ought to contribute to the product price that goes into the appraisal.

To demonstrate, consider what a business firm valuing stumpage for its use would do. If it tends to process the stand into yard lumber, if this is either its sole business or its best judgment as to the most profitable disposal of the stumpage, then this is the appropriate price to go into its analysis of

* Unless some adjustment for trends enters into the profit allowances and some correction for future price changes is also ascertained. Both of these factors mitigate the consequences of using past data in appraisal work.

the value of the stumpage. If it is the firm's intention to process the stumpage into boxes, or into furniture, or into either cruder or finer lumber products, then it is these products, and their end-prices, that will govern the firm's estimate of stumpage value; for such cases it will never be merely the value of the timber as dry lumber that is relevant.

From this it follows, for appraisal analysis, that if the appraisal is to approximate the ultimate market facts on stumpage value the simple notion of one end-product, as dry lumber, would have to be abandoned. It would mean that in any particular stand the appraisal would have to estimate the potential end-product of the likely bidders for the stand and, if there were half a dozen of them, say, and with each contemplating a different end-use after logging, the stumpage would have to be appraised on the basis of the several projected uses.*

Undoubtedly, to compute values for several end-products would vastly complicate appraisal work. Yet, if the appraisal is prepared to reflect the bidding facts, or attempt to secure the full economic value of the stumpage, it would have to proceed on this basis. Practically, several possible simplifications suggest themselves. For example, if all potential bidders in a particular area, or on a particular stand, are likely to process the same end-product then it is this end-product alone whose expected price need go into the appraisal. This would carry as corollaries that in the same region different end-products would have to enter into the calculations of appraisals; conceivably, even in the same area on different sales offerings different end-product prices may have to be entered.

Apart from the availability of other sources of lumber, this conclusion would be tempered in one other circumstance, to wit, if the price of surfaced dry lumber bore a constant and unvarying relationship to other end-product prices. Over some time length--which may even be long periods--for certain end-products this may well be the case.

Integration, End-Products, and Available Lumber Alternatives

As a facet of this analysis of end-products and appraisal value, the matter of integration and its effect on the economic value of a stand ought to be mentioned. As a firm adds new processing

* The one reservation to this is that if dry lumber is available to purchasers at a price below that of the appraised price and costs on processing the stumpage this constitutes an effective alternative limiting the stumpage price. See the next section below.

phases or production steps to its operations, and where there is a profit margin associated with each phase, it becomes clear that the economic value of the stumpage will be higher to the more fully integrated firm than to a less integrated rival. Neglecting the stage of integration, and thus the end-products of the user, would give false coloration to any bid analysis in which this aspect of organization was ignored. In appraisals, for reasons which we shall come to later, integration can be allowed for only when all--or most--potential bidders are integrated to approximately the same stage.

One important qualification, however, arises in this connection. If dry lumber is obtainable to integrated firms at a price which, after all processing, leads to a lower end-product cost than would be obtained by acquiring FS stumpage, if appraised on an end-product basis, only an irrational firm would purchase the latter. It is this case, therefore, of the availability of dry lumber that must act as a limit on appraisal of stumpage executed on the basis of end-product values. Where the utilization of dry lumber from remote alternative sources would lead to higher processing costs, then appraisal would be warranted both in principle and in practice according to ultimate end-product uses. Results would still be beneficial to the purchaser and, proceeds-wise, to the Forest Service.*

* That excess bidding has sometimes come not from the large integrated firms but from small loggers is not in contradiction to the argument outlined above, despite superficial observations to the contrary. Reflecting on the possibility of superior efficiency and productivity in the logging phase by small operators with immediate cost incentives, the possible cost savings are undoubtedly too small to explain excessive bids occasionally emanating from them. Instead, it is frequently remarked that by carefully sorting and classifying the species cut, and then selectively merchandising them to larger operators who are willing to pay premium prices for the varieties useful to them in their own operations, the small operator can do rather handsomely for himself.

This bears out the very point developed above, to wit, that from the standpoint of determining the full economic value of stumpage it is a mistake to appraise each timber stand on the supposition that its destination is surfaced dry lumber. What is in evidence in the selling operation just described is a search for processors who propose using the various species in the more profitable ultimate uses. This ties in with the arguments advanced concerning end-products.

Direct and Indirect Costs

The theory of stumpage prices as ordinarily developed presumes that direct costs are known quantities. While this hypothesis, too, is less than fully accurate, for the costs, as well as the prices, refer to estimates about them in the time period over which the stumpage is due to be cut and utilized, generally, apart from the matter of depreciation (discussed at more length below) cost estimates are likely to approach the facts more closely than the estimates on prices. The main possibility for error in prediction is in the case of wage rates--if depreciation phenomena are disregarded--though even here this is likely mainly when the labor market is in the throes of a change, with a pronounced tightening or easing of the market lying just beyond the horizon. By and large, we are probably not too far from the facts when we assume that the logger can judge the direct cost-bill with rather high accuracy.

It is when we come to indirect costs that we find a blurred image rather than a definite picture. For while direct costs are generally calculable, involving an immediate out-of-pocket outlay (with the exception of "user" depreciation*), it is otherwise with respect to indirect costs. For these involve the overheads of management and supervisory labor, of depreciation through time, of interest charges on indebtedness, etc. With the exception of the contractual interest outlay and rents, most of these sums can be of smaller or larger magnitude depending on the volume of operations, the size of related activities, and the period of time over which the activity extends. Further, encompassed are all the administrative activities, of bookkeeping, of clerical labor, of salesman and selling costs, where these may be important. There is likely to be far less standardization under this head than in the case of the direct, usually the unavoidable, costs. Nonetheless, the management for each firm is likely to be able to estimate its indirect costs in the light of its expected scale of operations and in the knowledge of its practices, including those most peculiar to it. The indirect-cost category is thus capable of harboring various disparate items, perhaps differing very substantially in magnitude between firms. Allowances among firms on this score can diverge rather widely.

Profit Allowances

Whatever the difficulties in isolating direct and indirect costs for each firm prior to estimating its (maximum) imputed stumpage value for a timber stand, difficulties are compounded rather disproportionately to the magnitudes involved when an attempt is made

* See Part VII below.

to estimate an appropriate profit allowance. The reason is not hard to find: the very notion of profits is nebulous in principle as well as in fact, in the realm of theory as well as in business affairs.

Consider this aspect to the problem. If we are dealing with a small family-size firm, as a retail store, the owner is not really interested in anything that might be termed a "profit" but instead, in something akin to a "decent wage." This also applies to the lumber industry, at least for smaller firms. Part of the profits is simply a wage; to lump such sums in a separate category and to assign them a new name, as "profits," is conducive only to fruitless discussion and acrimonious bickering when a price issue hinges on the outcome.

Secondly, with respect to equipment it is often argued that there must be a return on the "capital invested" in order to reward the businessman and maintain him in business. Unfortunately, this too is distressingly vague and says practically nothing until the precise sum of income is specified. What is the "capital invested" and what is an "appropriate return"?

This runs afoul of all the dilemmas of public utility valuation as well as all the intricacies of accounting and economic analysis. About all that can be said, with any warrant and validity, is that there is no simple and ready answer, apart from the precise psychology of the firm's management and the ends to be accomplished by economic policy. Usually it is intellectually more honest to plead simply for higher income to encourage new investment than to attempt to justify and rationalize earnings on the basis of past capital investment--there is no precise meaning of these words, however plausible they may sound.

Does the "invested capital" refer to the original cost of the equipment or plant? If so, in a period of inflation when prices have risen since the installation date businessmen will protest this interpretation--though feeling just as strongly and favorably attached toward it in a period of secular deflation. Original cost concepts, therefore, will not appeal to the businessman as an equitable basis for profit calculations if inflation constitutes the long run outlook.

Should depreciated value of the plant and equipment be used as representative of the invested capital? This has all the defects of the original cost estimates, with even less of its virtues, for while the original cost will (usually) be a fairly unequivocal quantity, the depreciation sums of accountants will usually be challenged by businessmen, sometimes as overstating the value of their plant, when taxes say are to be calculated on plant value, or of understating it, when profits are being related to it.

Should the market value of the plant be used? But this glosses over the lack of a continuous market for such items; appraisals cannot resolve the problem of value in a discontinuous or occasional market.

Should reproduction value be used? Again, businessmen are likely to be drawn to this point of view only in periods when inflation is in process, they are likely to oppose it in periods when prices are falling. Furthermore, why should the replacement cost today be taken of a plant that will not be replaced for a number of years? The appropriate replacement cost will be that prevailing at the time the renovation actually occurs, say 20 years hence; unfortunately, this sum cannot be known in advance. Even if a guess is made at general price tendencies it must be remembered that inventions and new techniques are constantly on the march so that ultimate results may differ markedly from even the best guesses.

Even if a more or less arbitrary choice is made among these various conceptions--each can be defended as vigorously as another--there is still the need to distill the meaning of the notion of an "adequate return." Safe to say, what is adequate for one individual and for one period of time may not be ample for another individual at the same time, or even the same individual at another time in the same or varied circumstances. For example, if the immediate income outlook is poor though future prospects are bright, a businessman would be willing to install equipment which he would reject when future prospects are bleak. Further, the sum that would be acceptable as "profits" on one processing and sale operation, or one phase of the firm's activities, can differ markedly from the overall returns required from all its activities. Thus the concept of an "adequate" earnings level has little meaning when elaborated and divorced from: 1) the individuals managing the firm; 2) the time period which the projected output operations cover; and 3) the longer run outlook for income and earnings, including tax aspects.

One further remark. The necessary profit allowances, if they could be unequivocally determined, would differ according to the volume of equipment utilized by the firm and the mode of financing employed. To illustrate, if the firm finances via stock issues, it need not have the same annual assurance of earnings as it would require if it resorted to bond debentures or bank borrowing. On the other hand, because of the smaller assurance of dividends on stock issues, expected earnings on this mode of financing would probably have to be higher over time. Hence, if any attempt is made to permit earnings according to the value of invested capital--if an agreed procedure could be found for determining the latter--the next problem would have to be one of deciding the "normal" or "appropriate" ratio of stock and bond financing if an adequate

rate of return on original investment value is to be permitted. The same earnings allowance could hardly be permitted regardless of the mode of financing; income tax laws recognize this (perversely perhaps) in permitting the treatment of interest on bonded indebtedness as a cost, but not extending the same cost exemption to earnings destined for dividends. This entails certain inequities when the main difference amongst certain firms has been in the mode of their financing.

The approach to a stumpage price in terms of a "normal" rate of profit also creates the further difficulty that not only must the value of the invested capital used be determined--however this is interpreted--but a "normal rate of return" must then be specified. As public utility cases and endless litigation testify, there is no manifest operational meaning that can be given to the concepts of "normal or fair return on fair investment value." The failure of courts to be precise in specifying its content provides rather conclusive evidence of its fuzziness. Furthermore, the application of the idea of a return on investment would call for a different profit sum and a different stumpage value for a firm that used little equipment compared to a firm that used a good deal of it.* Although differences in labor costs would be reflected in direct costs, the use of an average figure on investment value would yield too low a profit return to a firm using much equipment, though its direct costs would be overstated, and an opposite result for a firm using little equipment and much direct labor.

These, then, are the problems, almost insoluble ones, of trying to determine an "appropriate" or permissive volume of profits to be ascribed to business firms in anticipating, or appraising, maximum stumpage value. As a practical matter some results may be secured in this way: for each individual firm pondering the economic value of stumpage available to it in the market, there is probably a minimum profit margin per unit of output below which it would refuse to continue in production. This would represent a lower level of profits. Beyond this, an upper limit might be detected as levels well above the returns in other industries, as a profit volume at which the firm would regard itself as very fortunate and very successful indeed. Different firms might, then, regard themselves as subject to different profit levels, a minimum below which operations or desire for the stumpage might cease, and an upper level at which the prevalent view would be that earnings are highly satisfactory. Thus while the concept of a zone of profits might command fairly general agreement an attempt to sustain any fixed point within it would encounter almost interminable dispute. To an observer, therefore, the only test of the adequacy of a profit margin would be an operational one, of how firms react by way of expansion or contraction. Unfortunately, however, this test operates on a time lag.

* See below, pp. 90-92.

Thus it is in the computation of the profit allowance that disagreement is likely between appraiser and lumber mill, in good times and bad, for the plain fact is simply that the facts are not plain:* they are not patent for all to see and accept.

The Profit Range

At the moment there is no need to be too specific about the exact size of this profit range though we can enumerate some of the tests for fixing its dimensions. These are: (1) Whether the logging industry is expanding or contracting measured in terms of the number of firms and their mill capacity; (2) Profits as an absolute total compared to the recent past, the new capital investment, and the varying price level phenomena; (3) Profit movements compared to similar trends in other industries; (4) The nature and extent of overbids, as an index of acceptable profit margins (analogous to the use made of this idea in transactions analysis; see below Part VI); (5) Movements in interest rate phenomena, particularly of intermediate and long-run interest yields on Government and high-grade corporate obligations; (6) The trend and tenor of public utility rate-making decisions as indications of changing judicial attitudes and regulatory agency opinions on the current interpretation of "a reasonable return on prudent investment value."

It is not possible to assign rigid weights to each of these elements, for their importance can vary in different circumstances. Suffice to say, in considering the adequacy of profit allowances in the lumber industry in connection with the computation of maximum stumpage value, credence must be given to each element; judgment, however, must be exercised in arriving at a composite result applicable to the issue at hand.

Profits and Stumpage Prices

Once absolute profit sums have been set as appropriate under a given set of circumstances, any change in dry lumber (or end-product) prices relative to costs, or vice versa, will automatically alter stumpage values. One simple expedient in appraisals, for small price changes, would be merely to consider the price variations, on the presumption that costs remain reasonably stable over short periods of time, and permit stumpage prices to reflect product-price variations. That is to say, if prices rose by 50 cents per MBF, stumpage values could rise by this amount. For a fall, the reverse would hold. This

* It is just this vagueness that is ultimately revealed in the doctrine of a "fair return on prudent investment value."

would throw all changes in prices into stumpage values which, for short periods of time, would probably not be too far from the necessary economic facts to move the timber into use and maintain the industry in size and scale.* Over long periods, aside from changes in businessmen's views of a desirable profit outcome, this would encounter the objection that with higher lumber prices and the need for more finance to carry on the enterprise, the absolute amount of profit permitted would remain unchanged; this would be an inequitable and even an absurd result, especially if other costs also altered simultaneously. To avoid it, the profit margin would have to be estimated as a ratio of price, rather than as a simple absolute sum. But this need not be pressed further; there is no reason to argue that either the absolute profit margin or the profit ratio should be held constant over time despite varying external conditions.

This last discussion underscores another difficulty with the concept of a "fair return on prudent investment value." The problem is simply that this concept, if rigidly adhered to, would mean that in a period of rising lumber prices, with direct and indirect costs reasonably constant or rising at a lesser pace, the return in dollars to the firm would remain largely unchanged. The full burden of lumber price changes would be thrown upon stumpage so that economic forces would leave lumber firms almost unaffected. This is hardly a desirable result if the industry is to expand at times or contract under more adverse circumstances. Extending the analysis to the economy, when absolute profits for most other enterprises in associated fields of endeavor are likely to be rising, the fixed absolute sum necessary to constitute a "fair return" for lumber firms is likely to be unchanged. This conclusion would be avoided only if equipment prices rise under replacement cost formulae, or if the "fair rate of return" was modified--which is less frequent if court decisions are followed and rates of over 6% already prevail. Similarly, in a period of falling prices, while other enterprises are experiencing a fall in absolute profit sums, the "fair return," unless altered percentagewise, would remain constant. When lumber prices fell sufficiently stumpage prices could go to zero; ultimately, whatever the pleas for a "fair return" it might not be possible to squeeze this out of stumpage prices so that profitable operations would cease entirely. It is

* Viewing costs as the processing charge, this would keep the "spread"--the costs--constant so that final product--lumber--and raw material prices--stumpage--would move together in absolute amount. Proportionately, stumpage prices would thus move through a far greater relative range. See Part I above, footnote on "derived demand."

not always possible, even as public utilities know, to name prices (or utility rates) that will insure a "fair return" on "fair investment," nebulous as these concepts are to begin with.

Size Offering, Costs, and the Profit Aggregate

One further point neglected so far is the relation between output volume and the aggregate profit size. For example, if the same profit margin, say, of \$10 per MBF is maintained regardless of the size of the offering, then for a firm that bids the same stumpage price per MBF on, say, 10 million BF as on 12 million BF, absolute profits will be substantially higher for the larger stand despite the fact that the scope of operations and the amount of equipment used is roughly the same. A stand containing the somewhat larger volume is more desirable than one with smaller volume so long as either represents approximately the full annual cut for the firm. For this reason it would be surprising if overbids were not related to the size of the offering when appraised on the same basis where either stand will constitute the whole of the firm's annual operations.

The point involved is the rather simple one, to wit, that aggregate profits with a constant absolute gross margin, rise and fall with the volume of output--the size of stumpage in this case. The only way that this can be circumvented, and greater equity secured among those bidding for smaller as well as for larger stands, would be through a (slightly) smaller permissive gross margin included in appraisals as the size of the offering increased whenever the size of capital facilities utilized remained practically unchanged.

While the foregoing observation may explain certain bidding phenomena, profit margins per MBF may rise as the size of the stumpage offering increases for the perfectly good reason that, within limits, unit costs are capable of falling as the size of lumbering operations grows. This is the typical story of greater efficiency of large scale enterprise, a commonplace phenomenon in the American economy and the basis of our superior productivity compared to the smaller-scale, less capital-using firms in other countries. In the lumber industry it also entails the use of more equipment and less labor in larger operations and the programming of continuous work-flow through the year, as well as the possibility of using more of the timber cut in by-product uses. Of course, economies do not grow without limit as the scale of enterprise grows, and may even give place to diseconomies of scale; the remedy for the latter is a reduction in the size of operations.*

* While some doubt has been expressed as to the validity of the proposition of falling unit costs with larger operations, even the limited available data on mill-cost studies tend to confirm it.

Thus the reduction of costs as output grows, with given lumber prices, points in the direction of a higher conversion return and thus, both higher stumpage and a higher profit margin (to sales) on larger operations.* Insofar as this point is valid, and it must be valid otherwise the growth of relative "giant" firms in the lumbering industry as compared to their size a decade or two past can scarcely be understood, it does signify an association of the profit ratio to the volume of equipment relative to labor and, probably to the size of the offering; it tends to explain why more capital-using firms can outbid smaller firms in competing for the same stumpage.

This opens up the thought that in any appraisal of stumpage value it is necessary to take into account the size the projected operations and the difference in the ratio used of capital to labor. Insofar as the size of the stand offered and the cutting technique differs, the FS is not offering a homogeneous product nor meeting similar "average" operators.

The argument of the relation of costs to the size of operations has several other implications. Firstly, it suggests that where possible the size of the timber stumpage placed on the auction block ought to be geared to the optimal size of the plant operations in the vicinity to insure the highest conversion return and stumpage value; it would thus be representative of the level of operations to which the potential bidders aspire. Secondly, it implies that in appraisal it is probably invalid to use the same unit cost data for offerings appealing to firms of different size and capital-labor use: to use the same cost data for all scales of operation is to argue that there are no economies of scale. Finally, profit margins are likely to be more representative of forthcoming bids when they reflect the capital-labor use ratio pertinent to the scale of operations.

This last analysis opens one further thought, namely, that if a firm has some idle capacity it can bid high on small stumpage lots in order to enlarge the scope of operations and thereby lower unit costs. For example, if unit costs for a firm are \$1 lower per MBF for operations involving 10,000 MBF than at 2,000 MBF, if it already possesses the latter amount of stumpage and has an opportunity to bid for a new stand of 8,000 MBF, it can bid at least \$8,000 above an average unit price for this added cut: it can devote not only the extra profits on the added cut but also the cost-saving on the existing 2,000 volume

* See Part VI below. It is this point that leads to the suggestion of a non-uniform profit ratio whenever the ratio of equipment to labor differs between "average" firms bidding on different timber stands.

to its bid. If it can acquire the stumpage at a price less than this, its profit total will be enhanced. Related to this is the case where a firm has its own private timber reserves available for cutting. So long as it can recover something above direct costs on Forest Service timber, and achieve a scale of operations at which its total unit costs are reduced, it could regard its acquisition as profitable. Thus the protests of smaller operators that they cannot possibly meet the bids of larger buyers using their own and Forest Service stumpage to round out their level of operations appear plausible enough.

Availability of Non-Forest Service Stumpage

The effect of non-Forest Service stumpage offerings on Forest Service bid prices ought to be mentioned. In general, where these are appraised at prices below Forest Service appraisals (for comparable stands) buyers will endeavor to acquire the non-Forest Service offerings, from either the state or private selling sources. Nonetheless, so long as these holdings are inadequate to supply the demand, or so long as the full target quota continues to be offered by the Forest Service, then in competitive markets the prices paid for relatively equivalent stands ought to be about the same, whoever the seller is. The one qualification to this would come through the differences in costs required to cut the stumpage; higher costs on Forest Service stands, say, would lead to relatively reduced Forest Service stumpage prices. Hence, the availability of non-Forest Service stumpage offerings will affect Forest Service prices indirectly, for the most part. That is, cutting non-Forest Service timber will affect lumber prices through the supply side and thereby, have the usual repercussions on Forest Service stumpage prices. A decreased private cut will thus tend to raise Forest Service stumpage prices, and vice versa.

Stumpage Value and Bidding Phenomena

In general, the remarks hitherto were concerned with the economic importance of stumpage to the user; while the price and cost factors enumerated will influence bidding, several other determinants may also enter into the actual price offer of a lumber operator.

So far as bidding is concerned, a prospective purchaser must only go so far as to outbid other competitors, and not to name the maximum price he can pay. In a sense, the economic value of the stumpage to him, as determined by the price-cost factors described will constitute the rational maximum potential bid based on profit considerations: other considerations, such as tax laws and cutthroat competition, can also leave their mark. Further, bids can be governed by shorter rather than longer run profit considerations, with firms temporarily foregoing profit prospects by aiming merely to cover direct costs. It is only on bases such as these that overbidding by even the "average" firm--the object of Forest Service appraisals--become intelligible.

Consider, first, the matter of cutthroat competition. Here a firm could omit entirely any thought of immediate profits and seek to cover only direct costs: it is even possible that even these might be ignored and losses welcomed temporarily for the ultimate advantages through denying timber to competitors who can be driven out. The long run advantages for which the short run losses are embraced would consist either in winning the rival's special customers by driving him out, or to insure diminished competition for future stumpage--unless it is sheer spite and irrationality that motivates bidding behavior in these cases. There is little more to add on this subject at this time; the phenomenon will divorce bids from any "reasonable" appraisal and pose both interpretive and policy problems for the Forest Service.*

Tax phenomena have a similar incidence. What seems to be important here is the prospect of driving up stumpage prices on Forest Service offerings in order to realize a capital gain on private stumpage (taxable at 25% capital gains rates under Section 117 (K) of the Federal Revenue Code) offset in part by diminished taxable profits on Forest Service stumpage which would otherwise be subject to a 52% corporate tax rate: the added tax on one holding at 25% would have to be balanced against lesser taxes on the other.**

Similarly, a lumber operator requires stumpage to remain in business. Hence in any area where this is in short supply, to insure its survival a firm may literally throw long run discretion to the winds and bid on temporary and ephemeral considerations, forgetting profit needs entirely--a rational behavior pattern in the circumstances. Bids in such an event may bear little relation to appraisals which would have to be based on more durable factors.

Excluding such phenomena it will be the case that firms either more optimistic as to future lumber prices or in a higher phase of integration, or with a cost advantage, or in a quasi-monopoly

* See above, pp. 28.

** While a study of the effect of this tax provision would be interesting, and illuminate some special situations, it may be surmised that its total impact on stumpage prices, and bidding, has not been of decisive importance; its effect depends so substantially on a complex of facts, particularly of firms being of such size as to enable them to influence stumpage prices and also, to possess rather ample private stumpage. A full study would also introduce the matter of expectations held with respect to future lumber prices for these will influence decisions on whether to cut timber or defer the cutting, along with capital gains considerations.

position in the sale of a finished product, such as a nationally advertised brand of furniture, or a trade-marked processed wood, will be able to bid highest for stumpage. Hence, where appraisals are based on some "average" firm situation, overbids will become commonplace.

V. BID-APPRAISAL ANALYSIS

We now consider briefly some further aspects of bidding phenomena before examining some actual case experience of bid-appraisal relations in Regions 5, 6, and 8.

The brief statement of the theory of stumpage values represented was an attempt to explain the forces which can influence the ceiling bid-prices of the firm for any particular stumpage offering. If firms actually bid the maximum sum, and if the power to do so differed among firms, then of course the firm which could bid most would capture the stumpage offered.

In actual fact, however, if the ability to bid differs vastly among firms then the firm that could bid the maximum would only be required to bid a sum in excess of the next highest bidder: its full economic strength would not be tested. Thus if there were three bidders, with their maximum bids based on full profit considerations being \$50,000, \$40,000, and \$20,000 respectively, the low maximum bidder can obviously be shut-out by a bid just in excess of \$20,000, while the middle firm can be shut-out by a bid of just over \$40,000.

In all the previous cases the maximum bid was presumed to be conditioned on the imputed importance of the stumpage to the firm and premised on the proposition that the particular stand is vital to the firm's operations. Often the facts are such that the firm is possessed of effective alternatives, in the sense of other timber owned by itself or other private owners, or other prospective offerings by the Forest Service. Under these conditions, where the firm was willing to bid \$40,000 when pressed to the utmost, if it can find comparable stumpage at, say, \$30,000 then its maximum bid for the particular stand being offered will not be the \$40,000 limit but only \$30,000. Thus, the ceiling bid is limited not by the maximum that the firm would be willing to pay under the most adverse circumstances, but by the sum that represents the maximum in the light of the expected value excess to the firm of the particular stumpage under consideration and the price that would have to be paid for the next best alternative. Thus if \$40,000 could be paid on stumpage A. and \$15,000 on stumpage B. and if the latter can be acquired for \$5,000 then it becomes apparent that the firm would bid not \$40,000 for A. but only \$30,000, so that it can be assured of a "profit" of at least \$10,000 on its operations. Alternatives thus impose an effective check to the maximum bid on each offering of stumpage. Thus in an area in which several Forest Service and private timber offerings may be expected over a particular time period, the maximum price is unlikely to be bid on any particular stand.

If the bid ceiling is not reached then the successful bidder, in a sense, will obtain a bargain, paying less than the full economic value of the stumpage to him. On the other hand, if all bidders

are roughly in the same price-cost-tax, etc., position, and their other motives are approximately parallel and alternative stumpage limited in amount, then the array of bids is likely to be bunched so that the full maximum is likely to be extracted from the successful firm.

Sealed Versus Oral Bids

Bids are also conditioned by the information available to the respective firms. If this information is incomplete it is possible that the sums received by the Forest Service are not as high as they might be and, conceivably, the stumpage may not be secured by the firm most willing to pay top price for it.

Suppose in the preceding illustration that the two low bidders knew that they could be outbid. There would then be no point in their even putting in a claim for the stumpage with the result that, barring an effective appraisal price, it could go at a purely nominal price.* If lower bidders did put in their maximum bids then ultimately, approximately the second highest value estimate of the stumpage would be secured by the seller, the Forest Service in this case.

This leads to a consideration of sealed versus oral auction bidding on the hypothesis that there is no overt collusion among the participants. In the case of oral bidding, if each party, starting low, does reach his maximum, then in the preceding illustration the final sales price will go only to slightly in excess of \$40,000. If the low and middle bidder drop out en route the winning bid-price might even be lower. Conceivably, the low or the middle bidder might name a price of, say \$45,000 in the belief that the high potential bidder will top it and thus, the shut-out bidders may have the satisfaction of venting a personal grudge by making the victor pay more dearly for his triumph. If this objective is suspected it would occasionally be a good strategy for the more potent firm to fail to meet such excessive bids and thereby punish the weaker firms for their bidding zeal. Nevertheless, oral bidding might secure prices more closely approaching the maximum possible when individual cost-price conditions and their personal appraisals are not vastly different. Thus it is understandable to learn that some witnesses have objected to oral bids on the ground that the practice encourages high, even irrational, bidding behavior.

Sealed bids, on the other hand, are likely to place a stronger premium on guile and for strong firms, strategies which at times are likely to involve bluff. Usually, in the case of sealed

* Even this slight illustration points up the applicability of the "theory of games" to this problem.

bids there is only one bidding opportunity, the actual bid submitted which cannot be revised upwards as in the case of oral auction bidding. Each firm thus, apart from estimating the maximum that it can bid, must estimate the maximum that its rivals can bid and really will bid. Occasionally, where there is reason to believe that rivals will not bid the maximum then the strong firm can pursue, with some peril, a strategy which entails a lower bid price. In general, if the participants involved are approximately in the same economic position, there is no reason to expect that the results of oral and sealed bids should differ substantially over time for each firm will have fairly clear ideas on the bidding capacities and tendencies of its rivals. On the other hand, if the number and composition of the bidding firms alters, or if their cost experience changes and thus their bidding potential alters, the two techniques might yield different results. In these circumstances oral bidding is likely to be more conducive to higher prices to the seller than sealed bids for in the bidding process information is obtained by each of the participants about the bid behavior of its rivals. If the array of bid maxima are widely scattered because of cost differences this will still not succeed in securing for the Forest Service the maximum price for the stumpage, or what would be regarded as its full economic value although the result will more closely approximate this.

Combination of Qualifying Sealed and Oral Bids

One possibility to assure the seller (the Forest Service in this case) of the best of possible worlds would be not to publicize the appraisal price and request sealed bids, thereafter permitting oral bidding in excess of the sealed bid by all qualified bidders, i.e., those who submit sealed bids, over and above the appraised price. This would permit some revision of bids while, simultaneously, usually evoking a sealed bid closer to the maximum of the firm to assure it of participating in the oral auction. This approach might be particularly advantageous for situations where not more than one to three bidders were ultimately expected.

Concealed Appraisals

If appraisals were not announced in advance of sealed bids, to eliminate any arbitrariness the appraisal would actually have to be made and then sealed and stored to protect its secrecy. For the benefit and information of prospective bidders the principles of appraisal could be promulgated so that bidders were not wholly in the dark about possible appraisal results.

This remark opens up the whole issue of the consequences of appraisal announcements. Economically, they have the effect of fixing a price floor below which sales will not be made. Once made and announced they become a device to eliminate some bidders and certain of the potential bids. If appraisals are reduced in given price-cost conditions then overbids will be more frequent; if they are raised overbids will become less common. Thus the relation of bids to appraisals is no indication of under- or over appraisal until we have far more information on the nature and content of the appraisal. Unless the appraisal is designed to predict the ultimate market price there is no reason to expect the congruence of the two. If the objective is different, one other than to predict the final price, as, say, to predict the bid of the "average" firm then the bid result and the appraisal result can, and generally will, differ. The existence of overbids is thus hardly convincing evidence of low appraisals in multiple bid sales any more than the fact that there are sales at appraisals indicates irrationality and dissipation of profits in multi-bid situations.

Bidding by Species and the Rate Readjustment Clause

Currently, Forest Service procedure requires bidding by species and includes a clause providing for rate adjustments according to a movement in the lumber price index. The object of this is to take some of the price risk out of logging in a declining lumber market by reducing stumpage price to the purchasers as prices fall after acquisition date and transfer some of the price gains to the Forest Service in a rising market: bidders are protected in each quarter to the extent of 50% of a price fall while, likewise, they participate only in one-half of the price gain. The tactic, thus, is likely to be acceptable to the industry primarily in a declining market.

The procedure can thus influence bidding in sagging lumber markets inasmuch as loggers become partially insulated from price stresses. It is possible, however, to exaggerate the effect of this provision where price movements are gradual; with sharp market breaks expected the influence of the clause is likely to be stronger. In rising lumber markets bids are likely to be more restrained; industry resistance to the provision is also likely to grow in rising markets.

A word might be proffered on the matter of rate redetermination after 3 years have elapsed on longer Forest Service contracts. These, too, protect the bidder from the hazards of long run changes, narrowing the necessary purview to only three years: in this respect, some price risk otherwise retarding decisions is removed. While cost phenomena enter into rate redeterminations they do not appear in the quarterly readjustments. Most unfavorable from the operator's viewpoint (prior to the three year period) would thus be a cost rise accompanied by a price fall.

Rate readjustments, hence, are in part incomplete in rapidly changing cost conditions; fortunately these are less common than quick lumber price perturbations.

An Analysis of Bid-Appraisal Experience

An analysis to consider how closely the appraisals of Forest Service stumpage foreshadowed the market facts, as measured by the bid experience, was made for the year 1957, confined primarily to Regions 5 and 6, and in lesser degree, for Region 8. These regions were selected in view of the importance of Regions 5 and 6 in the aggregate sales scheme of the Forest Service and because in these regions alone the number of sales are of sufficient size and frequency as to make an interpretation of the data meaningful. For example, for the Fiscal Year 1957, the last for which totals were available at the time of writing, only Regions 6 and 8 reported over one hundred timber sales with a value of between \$20,000 and \$100,000, while only Region 6 reported over 100 sales ranging in excess of \$100,000. Only Region 5 approximated it in this respect, reporting 41 such sales. Next was Region 8 with 12 such sales. Region 8 was also selected for study because of the prevalence of sealed bids in this area compared to the oral bidding generally used in Regions 5 and 6. The facts on the size of sales, involving the total number in each category, are shown in Table 26.

It ought to be remarked, too, that the analysis was confined to bidding versus appraisal experience on sales of \$20,000 or over because it is believed that results on sales involving lesser sums are likely to involve a greater number of unpredictable and haphazard bidding factors; it is only when the operation becomes of such a size that profit calculation and income rationality preponderates that appropriate analysis can be made. Too, on smaller sales, where the Forest Service purposes are motivated primarily by forestry ends, it is doubtful that rigid rules governing appraisals can be effective or that stipulations covering all the possible contingencies can be enumerated without strangling the exercise of judgment and initiative in managing the nation's timber resources. It is this view which explains the preoccupation with the larger transactions. Too, as a practical matter it is the larger transactions that account for a good bulk of Forest Service revenues.

Bid-Appraisal Experience in Region 6

According to Table 27, there were 47 offerings in Region 6 in 1957 in which the appraised price fell in the \$20,000 - \$50,000 class. In all of these cases there was at least one bidder so that none of the sales had to be withdrawn for lack of a buyer at the appraised price or higher. There were 8 cases each in which there was only one bidder or three bidders; in 9 cases

the number of bidders totaled six or more, with one situation involving as many as 16 prospective purchasers at the appraised price or higher.

In the \$50,000 to \$100,000 appraisal class, there was one offering that had to be withdrawn because of a lack of a buyer; in 14 of the remaining 33 transactions there was only one buyer at the appraised price--and presumably higher. In appraisals involving stands valued at over \$100,000, in 7 cases there were no takers at the appraised price or higher. In 31 of the total of 70 cases there was only one bidder; of the full 70 cases, 60 involved 3 or fewer bids at the appraised price or higher. Thus, as the table makes abundantly plain, in the vast majority of cases in all appraisal categories, or in over 2/3 of the total cases, there were three or fewer bidders seeking Forest Service timber at the appraised price or higher.

Table 23 (and Chart 23) get at this basic data from a slightly different standpoint. Of sales receipts of \$21.4 millions from appraisals running upwards of \$20,000, a total of 47% of the sales, in value terms, was disposed of at appraisal prices (or a trifle higher in a few cases). Thus in this region the appraised price was literally the market price in transactions totalling some \$10 millions. Including 2 and 3 bid situations, the total of Forest Service receipts from such limited competition amounted to some \$16.7 millions, or some 78% of the total of receipts of the \$20,000 or higher transactions. ✓

In the appraisal class of \$100,000 or over, 53% of the receipts came from the one-bid situations and another 15% and 17% respectively involved two or three bids. Only 13% of the value of the larger transactions involved more than three bidders.

In the \$50,000 to \$100,000 category the story quickly changed in this respect: about 37% of the receipts in this class came from 4 or more bidders. The contrast again was marked in the smaller \$20,000 - \$50,000 class, where about 63% of the receipts in this group involved over three bidders. Not unexpectedly the evidence appears rather conclusive that more bidders are present in the smaller sales offerings as compared to the larger. ✓

Table 29 analyzes the bid experience from a slightly different vantage point. According to the evidence presented here, the ratio of the high bid to the appraised price in two-bidder cases amounted to some 113% for the classes below \$100,000, and 105% for the larger appraisal category. The second bids, interestingly, were approximately the same: it ought to be observed that as oral bidding is involved the high-bid need merely exceed the losing second bid; where the latter goes in excess of appraisal the high-bid must perforce do the same. ✓

Chart 23

VALUE OF TIMBER AT SALES PRICES, IN VARIOUS BID SITUATIONS AS
A PERCENT OF TOTAL VALUE OF TIMBER SALES

REGION 6, 1957

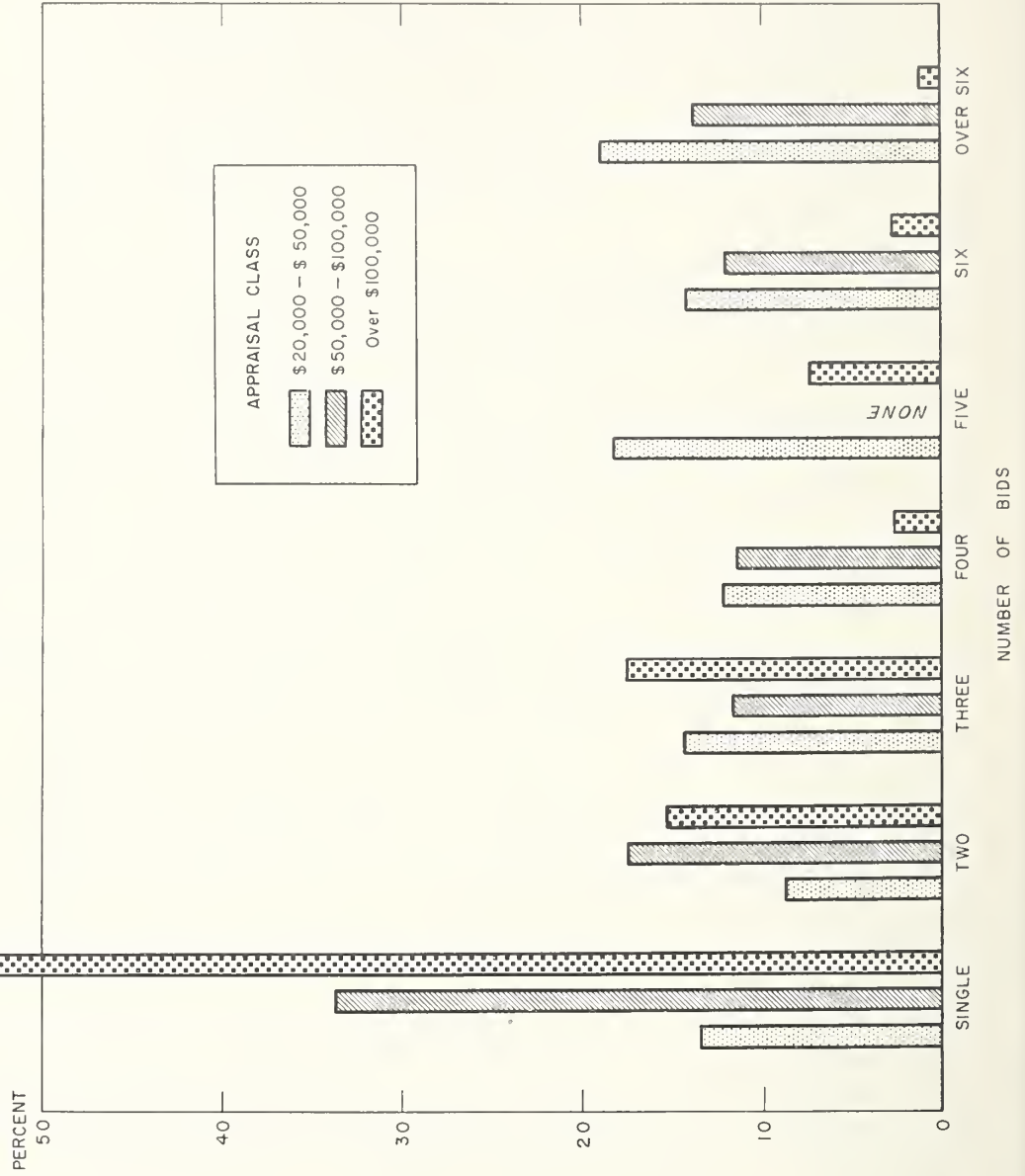


Table 26

Number of National Forest Timber Sales by Regions

Fiscal Year 1955

Region	Number of Timber Sales					Total No. of Sales
	Under \$20,000	\$20,000 to \$100,000	Over \$100,000			
1	2,179	59	10			2,248
2	1,582	13	3			1,598
3	3,789	19	5			3,813
4	2,503	22	3			2,528
5	1,107	43	41			1,191
6	3,915	136	118			4,169
7	2,320	8	--			2,328
8	6,457	151	12			6,620
9	2,705	6	--			2,711
10	129	6	1			136
Total						
Sales	26,686	463	193			27,342

Table 27

Number of Bids Received on Various Size Sales Offerings
of Forest Service Stumpage, Region 6, 1957

Number of Bids and Timber Offerings	Value of Appraisal		
	\$20,000	\$50,000	
	to	to	Over
	\$50,000	\$100,000	\$100,000
No Bids Received	0	1	7
Single Bid	8	14	31
Two Bids	5	6	12
Three Bids	8	4	10
Four Bids	5	3	3
Five Bids	5	0	4
Six Bids	7	3	2
Over Six	9*	3**	1***
Total Offerings	47	34	70

Source: Tabulated from Forest Service Forms 950.

* 1-Seven, 1-Eight, 2-Nine, 2-Ten, 1-Eleven, 1-Fifteen, 1-Sixteen

** 1-Nine, 2-Thirteen

*** 1-Fourteen

Table 28. Value of Timber, At Sales Prices, In Various Bid Situations
Region 6, 1957

Number of Bids*	Appraisal Class				All Classes			
	\$	%	\$	%	\$	%	\$	%
Single Bid	:273,662	: 13.4	: 946,090	: 33.7	: 8,851,452	:53.4	: 10,071,204	: 47.0
Two Bids	:176,787	: 8.7	: 488,313	: 17.4	: 2,529,101	:15.3	: 3,194,201	: 14.9
Three Bids	:291,893	: 14.3	: 326,458	: 11.6	: 2,904,753	:17.5	: 3,523,104	: 16.4
Four Bids	:247,608	: 12.2	: 321,450	: 11.4	: 431,699	: 2.6	: 1,000,757	: 4.7
Five Bids	:370,362	: 18.2	-----	----	: 1,205,980	: 7.3	: 1,576,362	: 7.4
Six Bids	:289,585	: 14.2	: 336,518	: 12.0	: 441,354	: 2.7	: 1,067,457	: 5.0
Over Six Bids	:385,039	: 18.9	: 367,913	: 13.8	: 208,500	: 1.2	: 981,452	: 4.6
Total	2,034,956	: 100.	: 2,806,742	: 100.	: 16,572,839	:100.	: 21,414,537	:100.

* All bids oral except two sealed in the \$20,000 - \$50,000 class.

Table 29

Relation of Bids to Appraisals in Various Bid Situations
By Appraisal Classes, Region 6, 1957

Bid Situation	Appraisal Class		
	: \$20,000	:\$50,000	:
	: to	: to	: Over
	: \$50,000	:\$100,000	: \$100,000
<u>Single Bid Situation</u>	:	:	:
1. Average Appraisal	: \$34,208	:\$ 67,426	: \$285,500
2. Average Bid	: 34,208	: 67,426	: 285,500
Ratio: Line 2 to Line 1	: 1.00	: 1.00	: 1.00
<u>Two Bid Situations</u>	:	:	:
3. Average Appraisal	: 29,946	: 69,079	: 199,683
4. Average High Bid	: 35,357	: 81,386	: 210,758
Ratio: Line 4 to Line 3	: 1.18	: 1.13	: 1.05
5. Average Second Bid	: 34,314	: 80,743	: 210,551
Ratio: Line 5 to Line 3	: 1.15	: 1.17	: 1.05
<u>Three Bid Situations</u>	:	:	:
6. Average Appraisal	: 30,011	: 73,265	: 237,367
7. Average High Bid	: 36,487	: 81,614	: 290,525
Ratio: Line 7 to Line 6	: 1.21	: 1.11	: 1.22
8. Average Second Bid	: 36,283	: 81,471	: 288,453
Ratio: Line 8 to Line 6	: 1.21	: 1.11	: 1.21
9. Average Third Bid	: 31,171	: 73,292	: 241,680
Ratio: Line 9 to Line 6	: 1.04	: 1.00	: 1.02
<u>Four or More Bid Situations</u>	:	:	:
10. Average Appraisal	: 30,662	: 73,634	: 152,872
11. Average High Bid	: 49,206	: 116,203	: 228,753
Ratio: Line 11 to Line 10	: 1.60	: 1.58	: 1.50
12. Average Second Bid	: 48,948	: 115,686	: 226,281
Ratio: Line 12 to Line 10	: 1.59	: 1.57	: 1.48
13. Average Third Bid	: 40,334	: 107,984	: 187,767
Ratio: Line 13 to Line 10	: 1.31	: 1.47	: 1.23

In 3-bid situations the excess of bid over appraisal involved somewhat more than a 20% overbid in the case of the smallest and the largest of our classes, and about an 11% overbid in the intermediate \$50,000 - \$100,000 class. The losing third bid, in most of these cases, was at the appraisal level.

When we get to the four or more bidders situation, the results really loom as significant. In the smallest of our appraisal classes the excess of the successful bid over the appraisal amounts to some 60%, and almost the same figure in the intermediate class. For the \$100,000 and over category the successful bid ratio to appraisal amounts to some 50%. The relation of the second bidder to appraisal is not very different; this is shown in the table, with a bid spread between the bid price of the second bidder and the third bidder, in the usual case.

Some further light on the ratios of bid prices to appraisals is shown in Table 30. According to this, the most frequent situation is one in which the sale takes place at the appraisal or at a bid about 10% above appraisal. This result covers about 53% of the cases. In only 4 cases did the successful purchaser have to pay a price of more than double the appraisal and in only 23 of the total of 143 cases, or 16%, did the appraisal ratio run to 50% or more of the appraised price. Similar conclusions can be deduced from an examination of Table 31, concerned with the ratio of the second-high bid to the appraisals. Here, too, most of the cases involve an overbid of up to 10%. Greater overbids seem to be scattered at random over the range, with the numbers involved generally too small to permit generalization.

Bid-Appraisal Experience in Region 5

A similar analysis of the appraisal-bid experience has been made for Region 5, also covering the calendar year 1957.

According to Table 32, in 5 cases there were no bids received at or above the appraised price on stands offered for sale and on which an appraisal had appeared. Of the remaining 68 cases in which a sale took place, in 36 cases (53%) there was only one bidder, with this situation being most pronounced on Forest Service sales appraised at \$100,000 or more. In the latter case, of 26 transactions - 3 involved no-sale out of the 20 offered - 17 sales involved a single bidder. Of the 9 remaining cases, in 5 of them there were just two bidders.

Of the 23 sales in the \$50,000 - \$100,000 class, 10 involved single bids and another 4 had two bidders. Of the 21 cases in the \$20,000 - \$50,000 category, there were 9 single bids and another 4 containing two bidders. It ought to be pointed out that in the classes under \$100,000 sealed bids were almost as numerous as oral bids.

Table 30. Frequency Distribution of Ratios of High Bids
to Appraisals, Region 6 - 1957

Bid-Appraisal Ratio	:	Frequency Distribution		
	:	\$20,000	:	\$50,000
	:	to	:	to
	:	\$50,000	:	\$100,000
	:		:	Over
	:		:	\$100,000
At Appraisal	:	8	:	12
	:		:	31
1.00-1.10	:	6	:	7
	:		:	12
1.10-1.20	:	7	:	2
	:		:	5
1.20-1.30	:	6	:	3
	:		:	3
1.30-1.40	:	2	:	1
	:		:	3
1.40-1.50	:	6	:	2
	:		:	4
1.50-1.60	:	2	:	2
	:		:	1
1.60-1.70	:	4	:	1
	:		:	2
1.70-1.80	:	2	:	1
	:		:	0
1.80-1.90	:	1	:	1
	:		:	1
1.90-2.00	:	0	:	0
	:		:	1
Over 2.00	:	3	:	1
	:		:	0
Total Cases	:	47	:	33
	:		:	63

Table 31. Frequency Distribution of Ratios of Second High-Bids
To Appraisals in Two or More Bid Cases, Region 6 - 1957

Bid-Appraisal Ratio	Frequency Distribution			
	\$20,000	\$50,000	Over	
	to	to	\$100,000	
	\$50,000	\$100,000	\$100,000	
1.00-1.10	6	5	18	
1.10-1.20	9	2	5	
1.20-1.30	4	3	3	
1.30-1.40	2	1	3	
1.40-1.50	6	2	4	
1.50-1.60	2	2	2	
1.60-1.70	4	1	1	
1.70-1.80	2	2	0	
1.80-1.90	1	0	1	
1.90-2.00	0	0	1	
Over 2.00	3	1	-	
Total Cases	39	19	38	

Table 32

Number of Bids Received on Various Sized Sales Offerings
of Forest Service Stumpage, Region 5 - 1957

Number of Bids and Timber Offerings	Value of Appraisal		
	\$20,000	\$50,000	
	to	to	Over
	\$50,000	\$100,000	\$100,000
No Bids Received	2	0	3
Single Bids	9	10	17
Two Bids	4	4	5
Three Bids	4	5	2
Four Bids	1	3	1
Five Bids	1	--	1
Six Bids	--	--	--
Over Six	--	1*	--
Total Offerings	21**	23***	29

* Seven bidders

** Includes 10 Sealed, 11 Oral Bids

*** Includes 10 Sealed Bids, 13 Oral Bids

Source: Tabulated from Forest Service Forms 950.

Examining Table 33, and Chart 24, it appears that in Region 5, even slightly more than in Region 6, 51% of the proceeds from appraisals of \$20,000 or more, or for \$5.2 millions of sales receipts there was only one bidder. With the two-bidder situations included, 65% of such receipts went in sales involving such limited competition. Looking at the category of \$100,000 and over, 57.5% of revenue came from single bid transactions and another 12% from two-bid transactions. In the intermediate appraisal range, 35% of the receipts occurred in one-bidder situations and another 16% involved two bidders. For the smallest of our appraisal classes 35% involved the presence of only one bidder and another 25% had two bidders.

Examining the relation of bids to appraisals (Table 34), even in the one-bidder situation the bid price aggregate slightly outweighs the appraisals: this can be accounted for by the presence of sealed bids. As we go up the scale to two bidders, the bid-appraisal ratio rises markedly. In the \$20,000 to \$50,000 class we find a rather anomalous result, with the ratio of bids, on the average, just about double the appraisals. In part this is due to the influence of a few unusual cases: in one timber stand, with the appraisal just under \$25,000 the successful bidder offered over \$75,000; in another case \$34,000 was offered for stumpage appraised at \$35,700. In several cases an overbid of 50% appeared. Still, it seems reasonably evident that with an increase in the number of bidders we witness a greater excess of the successful bid over the appraisal price. This is typically the case in the appraisal group of \$100,000 and over, and in the \$50,000 to \$100,000 class. While it is not quite so in the small appraisal class, as there are a few cases on the abnormal side in this group, and considering the small number involved the picture is somewhat distorted by their presence.

The frequency distribution of the various bid-appraisal ratios appears in Table 35. In most instances, according to this data for Region 5 the final sales price settled either at the appraisal or within a range up to 10%. This relationship accounts for 61% of the cases tabulated, or 40 of the 66 instances.

Looking at the experience of the ratio of the second-high bidder to appraised price, for those cases in which there were two or more bidders the common experience involves a bid hovering up to about 10% in excess of the appraisal. (See Table 36.) All of this attests either to: 1) the importance of the appraisal price in determining the ultimate price in the vast majority of cases; or 2) the correctness of the appraisal price in prejudging the market price so that conceivably, even if the appraisal had not been announced the final sales price would have settled at approximately the same figure.

Chart 24

VALUE OF TIMBER AT SALES PRICES, IN VARIOUS BID SITUATIONS AS
A PERCENT OF TOTAL VALUE OF TIMBER SALES

REGION 5, 1957

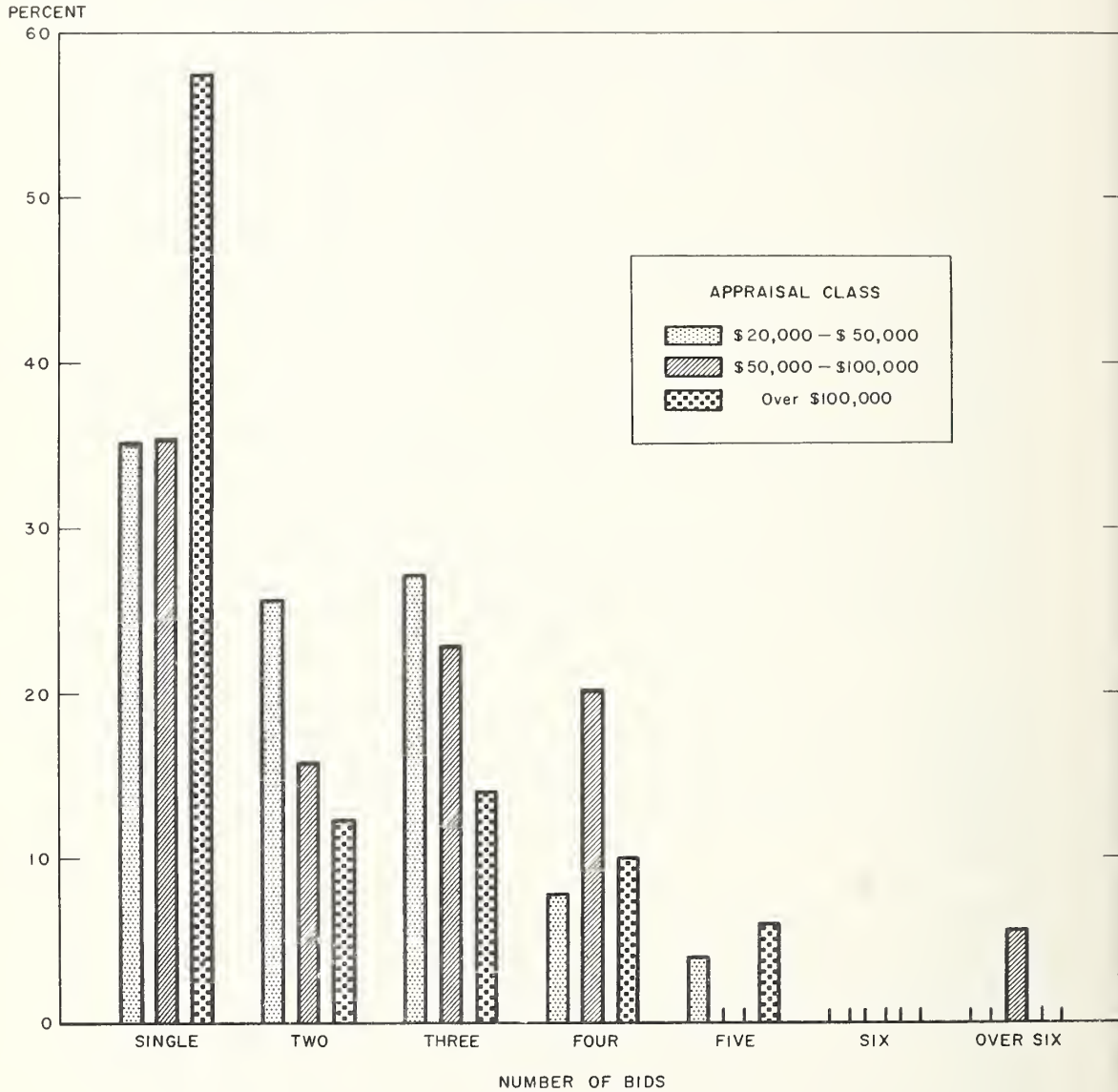


Table 33

Value of Timber, at Sales Prices,
in Various Bid Situations, Region 5, 1957

Number of Bids	Appraisal Class						All Classes	
	\$	%	\$50,000 - \$100,000	\$	%	Over \$100,000	\$	%
Single Bid	286,393	35.2	748,483	35.4	4,199,103	57.5	5,233,979	51.1
Two Bids	208,419	25.7	333,113	15.8	907,952	12.4	1,449,484	14.2
Three Bids	221,511	27.2	484,251	22.9	1,025,772	14.0	1,731,534	16.9
Four Bids	64,222	7.9	427,648	20.2	738,015	10.1	1,229,885	12.0
Five Bids	32,885	4.0	---		435,240	6.0	468,125	4.6
Six Bids	---		---		---			
Over Six	---		120,560	5.7	---		120,560	1.2
Total	313,430	100.0	2,114,055	100.0	7,306,082	100.0	10,233,567	100.0

Table 34

Relation of Bids to Appraisals in Various Bid Situations
by Appraisal Classes, Region 5, 1957

Bid Situations	Appraisal Class		
	:\$20,000	:\$50,000	:
	to	to	Over
	:\$50,000	:\$100,000	\$100,000
<u>Single Bid Situation</u>	:	:	:
1. Average Appraisal	:\$31,755*	:\$ 71,770***	:\$242,361****
2. Average Bid	: 31,821*	: 74,848***	: 247,006
Ratio: Line 2 to Line 1	: 1.00	: 1.04	: 1.02
<u>Two Bid Situations</u>	:	:	:
3. Average Appraisal	: 26,229	: 67,962	: 168,985
4. Average High Bid	: 52,105	: 83,278	: 181,590
Ratio: Line 4 to Line 3	: 1.99	: 1.23	: 1.07
5. Average Second Bid	: 41,230	: 76,077	: 170,763
Ratio: Line 5 to Line 3	: 1.57	: 1.12	: 1.01
<u>Three Bid Situations</u>	:	:	:
6. Average Appraisal	: 31,174	: 76,170	: 442,509
7. Average High Bid	: 55,373	: 96,850	: 512,886
Ratio: Line 7 to Line 6	: 1.78	: 1.27	: 1.16
8. Average Second Bid	: 48,752	: 93,045	: 508,254
Ratio: Line 8 to Line 6	: 1.56	: 1.22	: 1.15
9. Average Third Bid	: 39,577	: 83,516	: 489,557
Ratio: Line 9 to Line 6	: 1.27	: 1.10	: 1.11
<u>Four or More Bid Situations</u>	:	:	:
10. Average Appraisal	: 29,745**	: 80,504	: 334,019
11. Average High Bid	: 48,538	: 137,052	: 586,627
Ratio: Line 11 to Line 10	: 1.63	: 1.70	: 1.76
12. Average Second Bid	: 48,176	: 114,231	: 585,158
Ratio: Line 12 to Line 10	: 1.62	: 1.42	: 1.75
13. Average Third Bid	: 44,423	: 82,749	: 473,042
Ratio: Line 13 to Line 10	: 1.49	: 1.03	: 1.42

* Presence of two sealed bids accounts for the discrepancy.

** Two cases

*** Three Sealed Bids

**** Four Sealed Bids

Table 35. Frequency Distribution of Ratios of High Bids
to Appraisals, Region 5, 1957

Bid-Appraisal Ratio	Frequency Distribution			
	\$20,000	\$50,000		
	to	to	Over	
	\$50,000	\$100,000	\$100,000	
At Appraisal	6	5	14	
1.00-1.10	4	5	6	
1.10-1.20	-	1	1	
1.20-1.30	-	1	2	
1.30-1.40	-	2	1	
1.40-1.50	1	4	-	
1.50-1.60	3	1	-	
1.60-1.70	2	-	1	
1.70-1.80	-	-	-	
1.80-1.90	-	1	-	
1.90-2.00	-	-	-	
Over 2.00	3	1	1	
Total Cases	19	21	26	

Table 36. Frequency Distribution of Ratios of Second Bids
to Appraisals, Region 5, 1957

Bid-Appraisal Ratio	Frequency Distribution		
	\$20,000 to \$50,000	\$50,000 to \$100,000	Over \$100,000
1.00-1.10	1	5	6
1.10-1.20	-	1	-
1.20-1.30	-	2	-
1.30-1.40	1	2	1
1.40-1.50	1	-	-
1.50-1.60	3	-	1
1.60-1.70	2	-	-
1.70-1.80	1	-	-
1.80-1.90	-	-	-
1.90-2.00	1	-	-
Over 2.00	-	1	1
Total Cases	10	11	9

Bid-Appraisal Experience in Region 8

As the experience in Region 8 is derived wholly from the use of sealed bids, it is instructive to examine the record achieved, to determine wherein it may be distinguished from the outcome in Regions 5 and 6 where oral bids are used more commonly.

Table 37 contains the cases in which there was but one bidder; it is interesting to find that even in the case of sealed bids a larger number of transactions involved sales at the appraisal, in 15 cases out of the total 57. In 24 of the cases the final price was between the appraisal value and 5% above. A bid ratio of 15% above the appraisal would exclude only three cases. The data, as the table notes, cover all those transactions in which the appraisal was \$15,000 or higher.

Table 37. Frequency Distribution of Ratio of Bids to Appraisals in One-Bid Sales, Region 8, 1957* (Includes only Appraisals of \$15,000 and Over)

<u>Bid-Appraisal Ratio</u>	<u>Frequency</u>
At Appraisal	15
1.00-1.05	24
1.05-1.10	5
1.10-1.15	10
1.15-1.20	1
1.20-1.25	2
Total Cases	<hr/> 57

* All Bids Sealed

In Table 38 the various cases involving one or more bidders are arrayed with the list containing the number of instances in each bid category, the average appraisal, and the average high bid; there is also the ratio of the high bid to the appraisal. Of the 181 cases, a total of 57 consisted of one-bid situations and 47 entailed two bidders. Together with the 38 three-bidder situations, approximately 80% of the cases are included.

As the table shows, the average appraisal in all of these cases is reasonably similar in size. Examining the relationship of the high bid to the appraisal, the ratio rises from 1.04 to 1.14 to 1.22 as we move from a one-bidder to a three-bidder market and then, despite the fall in the four-bidder

Table 38. Ratio of High Bids to Appraisals in Various Bid Situations, Region 3, 1957* (Includes Appraisals of \$15,000 or over)

No. of Bidders	:	No. of	:	Average	:	Average	:
	:	Cases	:	Appraisal	:	High Bid	Ratio
One Bidder	:	57	:	\$52,573	:	\$54,867	1.04
Two Bidders	:	47	:	44,423	:	50,510	1.14
Three Bidders	:	38	:	56,480	:	69,185	1.22
Four Bidders	:	19	:	57,955	:	67,201	1.16
Five Bidders	:	17	:	39,738	:	52,666	1.33
Six Bidders	:	2	:	45,268	:	71,416	1.58
-----	:		:		:		
Eight Bidders	:	1	:	58,163	:	71,746	1.23

* All Bids Sealed

case, a continuous rise in the bid-appraisal ratio as the numbers grow to six bidders; in the latter situation (for the two cases involved) the bid rose to 158% in excess of appraisal. In the one case of eight bidders the bid ratio amounted to 123%.

According to the frequency distribution (Table 39) of high bids to appraisals, in 75% of the cases the ratio of bids to appraisals involved a bid-appraisal ratio of 1.20 or less. Most of the cases fall into the category of a sale either at the appraisal or to about 10% above.

Table 39. Frequency Distribution of Ratios of High Bids to Appraisals, Region 3, 1957* (Includes Cases of Appraisals of \$15,000 and over)

<u>Bid-Appraisal Ratio</u>	<u>Frequency Distribution</u>
At Appraisal	15
1.00-1.10	68
1.10-1.20	54
1.20-1.30	26
1.30-1.40	11
1.40-1.50	3
1.50-1.60	1
1.60-1.70	2
--- ---	-
1.90-2.00	1
	<u>181</u>

* All Bids Sealed. There were a total of 29 cases in which there were no bids received.

Hence, with sealed bids it is quite uncommon for a successful bidder to offer a price in excess of 40% of the appraisal, with most of the bids ranged within 10% of the appraisal.

Some Tentative Conclusions

Reflecting on the results of the bid experience as summarized in the tables for Regions 5, 6 and 8, several tentative conclusions suggest themselves.

First, it seems reasonably plain that in cases where there was only one bidder, sealed bids have been slightly more effective from the Forest Service standpoint in insuring a trifle higher return for the stand; to validate this conclusion it is probably also necessary that the likely bidder believes others will, or may, bid. Simultaneously, the comparative experience seems to signalize that when there are several bidders the oral form is likely to lead to higher ultimate prices paid by the successful purchaser than with sealed bids: the latter seem to be arrayed very closely within a range of 10% to 20% of the appraisal. Experience in Region 5, however, seems to demonstrate the prospect of bids going well above 20% of appraisal in oral auctions as the number of bidders increase. ✓

From an examination of the data on bid and appraisal relationships it is very easy to infer that as the number of bidders increase the bid-appraisal ratio is likely to rise and the return of the Forest Service is likely to be more profitable and remunerative. The question is whether this judgment is warranted.

This conclusion would be unassailable, and the interpretation of the data in this light would be indisputable if we were entitled to assume that all timber stands were appraised according to the same formula. If this were so, and if the data showed up with a higher bid ratio as the number of bidders increased, then it could be insisted that competition alone was the best guarantee of high prices to the Forest Service while, at the same time, permitting firms to earn sufficient profits to remain in the logging field.

Unfortunately, this is precisely the area of doubt, where obscurity rather than clarity prevails. For example, if the Forest Service appraisal tends better to predict the market price then, through appraisal technique alone the number of bidders will be reduced and the situation may end up with only a single-bidder present. In this event, the final sale may well take place merely at the appraised price. Thereafter, by examining data such as is contained in our tables, one would conclude that in one-bidder situations sales occur ✓

at the appraised figure. Ironically, this would be a consequence of the fact that through appraisal other potential bidders have been eliminated; if the appraisal had been set, say, 30 percent lower it is possible that there might have been several bidders and the final price would then show an overbid of 42 percent.* To illustrate, if a stand is appraised at \$100,000, there may be only one bidder willing to pay this price and hence, in the tabulation it would seem that with one bidder the appraised price becomes the market price. On the other hand, if it was appraised at \$70,000 then there might be other bidders, say four, with the final price once again ending up at \$100,000. In the latter case one would then conclude that with spirited bidding, the price exceeds the appraised price, involving a bid-appraisal ratio of 142 percent. Yet this view, that at a \$100,000 appraisal the Forest Service was not maximizing its receipts at a \$70,000 appraisal it was doing rather well, would be an unwarranted and erroneous conclusion. So much of the story of the relation of bids to appraisals, and the ultimate size of the bid-appraisal ratio, depends not only upon the latent competition in the region but also upon the nature of the original appraisal.

While the position of sales at appraisal as constituting evidence of a better market forecast is logically as tenable as the criticisms of under-valuation, so far as the writer is aware there is no available evidence to support the view that in the single-bidder situations appraisals were made on a different basis than in the multi-bid cases. While it appears that the cases listed in the sale reports seem to have been made on about the same appraisal considerations, only closer study could show this conclusively.

Among the other conclusions suggested by an analysis of the bid data is that in both Regions 5 and 6 the proportion of single-bid situations increases with the size of the offering. Single-bid situations are relatively less common in the \$20,000 to \$50,000 class than in the two larger groupings. Conversely, though this is not universally the case even for the data we have, there is a strong tendency for the overbid ratio to be higher on the smaller than on the larger offerings. Not only are the non-competitive cases thus relatively fewer on smaller offerings but also the ratio of bids to appraisals seems to be higher for the smaller class even in cases where marked competition does not develop. This evidence would support the proposition that, from a Forest Service income standpoint, it would be desirable to limit the size of offerings rather than have them grow larger generally where they encounter fewer potential buyers.

* Thus overbidding may be a consequence of the appraisal being too low while sale at the appraisal, conceivably, might attest to the accuracy of the appraisal.

Species Quality and Overbids

Another point worth noting in connection with this examination of overbid experience is that there may be a connection between the composition of the species in a timber stand and the over-bid ratio. For example, where the stumpage consists predominantly of low quality timber it is readily conceivable that a few cents difference between appraisal price and bid price per MBF can lead to rather grotesque results when examined in terms of ratios. The following data bear this out:

Table 40. Average Appraised Prices and Bid Prices, By Species
Region 5, 1954*

Species	Average Appraised Price Per MBF	Average Bid Price Per MBF	Ratio
Ponderosa Pine 293,457 MBM	\$26.34	\$28.02	106.4
Sugar Pine 121,061 MBM	29.54	32.03	103.4
Red & White Fir 187,037 MBM	1.99	2.29	115.1
Douglas-fir 352,288 MBM	2.94	4.70	160.1
Incense Cedar 32,698 MBM	2.13	2.36	110.8
Total 986,362 Average	\$12.96	14.46	111.6

* Release of Region 5, January 13, 1955

As this table shows, the greatest overbid ratio occurred in the low-valued species, in the Douglas-fir appraised at \$2.94 and the Red & White Fir at \$1.99. A narrow gap between bid and appraisal appeared on the sugar and the Ponderosa Pine species. Although no attempt has been made to tackle the formidable classification problem of separating the overbid cases according to the composition of the stands, it would be surprising if this relationship of overbidding to the quality of the timber stand did not have some influence on the bid-appraisal ratios.

Some Suggestions

Considering that relatively few cases are involved, and in the light of the importance of the information in revealing the degree of competition in Forest Service sales, it would be

c
desirable if tables of the sort presented in this Part (Tables 26-39) were prepared on an annual basis. Further in view of its crucial importance in criticisms of the Forest Service, and in understanding Forest Service sales practices, some attention ought to be devoted to an analysis of the single-bid results, to confirm or deny the question of whether appraisals in these cases were on about the same basis as in multiple-bidder overbid situations. Perhaps a separate report on each single-bidder sale on an appraisal of \$50,000 or more might be made and contrasted with appraisal situations of the previous quarter or half-year when multiple bidders and overbids occurred on corresponding-size sales.

Too, some study might be given to the relation of overbids to the quality of species. To hold the problem within manageable limits initially, multiple-bid situations in which the overbid ratio was about 10% or less might be compared to cases where overbids were 40% or more in excess of appraisals. If some pattern revealed itself the study might be pursued further.

Finally, the Forest Service might wish to consider whether sealed bids may not have some greater application in situations where only one bidder is likely though it is not sure to this bidder that other firms might not want to bid. If some chance exists of another bidder, a sealed bid might be more rewarding to the Forest Service. In the same vein, the question of concealed appraisals might be reviewed for at least occasional use. It would have advantages over the combination of announced appraisals and sealed bids for with a concealed appraisal it could be possible to combine oral auction bidding with the sealed bids: all firms whose sealed bid exceeded appraisals would be permitted to participate in the oral auction. This combination, too, as we shall observe in the examination of transaction-analysis, might indirectly help resolve some Forest Service appraisal difficulties.

VI. AN EXAMINATION OF TRANSACTIONS ANALYSIS

Description and analysis of the method which the Forest Service refers to as "transactions analysis" as a guide for its appraisal procedures was hampered by the fact that few documents of the actual mode of making the appraisals were at hand. Hence the following pages do not purport to be an account of the application of the theory though they do reflect the spirit and ideas current in the Service on the meaning and nature of the method. Further, at the time of writing alternative variations in the technique were under consideration so that it is likely to prove most useful, in this section, if some of the main ideas, and issues, were evaluated.

Transactions Analysis: The Rothery Statement

The important early statement of transactions analysis, not without influence on Forest Service thinking and appraisal practice, was contained in the well-known article published by Julian Rothery in 1945.* It is worthwhile to summarize this article at some length before submitting it to critical evaluation.

After some preliminaries, Rothery goes on to enumerate several techniques of appraisal.** Finding most of them deficient on one count or another, he is led to a statement of his position. Among the methods he rejects are: (1) those which treat stumpage as simply a percentage of the selling price of the lumber; (2) the treating of stumpage as a residual after deducting a certain percentage of logging and manufacturing costs as an "overturn" margin for profit and risk; (3) a deduction for profit and risk linked to the investment in plant and equipment; this is deemed unsatisfactory when plants are old and their value uncertain; there are also the problems connected with deciding upon an appropriate rate of return.

* Julian E. Rothery, "Some Aspects of Appraising Standing Timber," Journal of Forestry, July 1945.

** Although not vital in this context, several of Rothery's preparatory remarks would be unacceptable to a professional economist. There is, for one thing, the quoted view that "market value...is that competitively established price...." Surely market value is market value, competitive or otherwise; monopoly and its variants all lead to a market price. The very problem of appraisal arises because of the absence of competition, in the economist's sense. Rothery's remarks on the "lack of compulsion" in establishing a "fair" price likewise hardly advances understanding. These, it may be admitted, are mere trifles in his paper but they have tended to color thinking and focus attention on several irrelevant aspects of price-making.

Rothery then develops his own contribution, using the following table where Tract F is being appraised and where bids have previously been received on Tract E, which represents a "recent sale of a similar stand near by, of about equal volume. The physical conditions of the two tracts and the risks and the trends are deemed to be essentially the same."* Rothery goes on to say that on Tract E the "bids were made by three mills of similar type, and competition was good but not forced."

(All Figures in MBF)

	Tract E, Actual Bids			Tract F Appraisal
	<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>	
1. Selling Price	\$38.60	\$38.60	\$38.60	\$35.40
2. Total Cost (incl. depreciation)	<u>26.20</u>	26.20	26.20	24.50
3. Conversion Return	12.40	12.40	12.40	10.90
4. Stumpage (or Bid Price)	<u>7.50</u>	8.25	8.50	7.10
5. Profit and Risk	4.90	4.15	3.90	3.80
6. Valuation Factor (line 4 ÷ line 3)	.605	.665	.685	.651
7. Operating Ratio (lines 2 ÷ 4 ÷ line 1)	.873	.892	.899	.893
8. Profit Ratio (line 5 ÷ lines 2 + 4)	.145	.120	.112	.120

The figures pertaining to Bids 1, 2, 3, and Tract E are self-explanatory. It is with respect to the appraisal on Tract F that some explanation is in order. First, the change in selling price and costs call for but a moment's mention; apparently, either the average composition of the timber on E and F differs or market prices have changed or are expected to change between the date of the E transaction and the time when F is to be marketed; the exposition is not very clear on this though Rothery, at a slightly later place, declares this price "based on recent and applicable net f.o.b. mill realization for the grade-recovery percentages shown by a quality check...." (p. 495)

Thereafter, the determination of the conversion return for the appraisal of Tract F is immediate. It is at this stage that Rothery arrives at the core of his analysis, prefacing it as follows:

* The words "of about equal volume" and the consistent emphasis on comparability ought to be underscored.

Value is predicated on typical or representative conditions and represents what the average buyer is assumed to be willing to pay under those conditions. The middle bid for Tract E is taken as representative of average conditions and a fair market price, an assumption supported by the fact that one of the possible purchasers considered it high and the other low. (p. 493)

Going on:

This bid of \$8.25 per M shows a profit of 12 cents per dollar of total costs. We do not know how much the plant and working capital amount to in this instance, or what rate of return is customary, and such estimates might be uncertain at best; but we do know that the middle bidder considered that \$8.25 stumpage would leave an adequate return on his investment whatever it might be. On the basis of the appraisal figures, the profit margin of 12 cents per dollar of total current costs gives an excellent yardstick for the appraisal of Tract F. Here the investment and risks are considered to be much the same, but both the costs and the selling price are less.

Thus the profit ratio is taken over from Bid No. 2 on Tract E and applied in the appraisal of Tract F. We might follow Rothery through one further expository paragraph:

Evidently the conversion return of only \$10.90 per M does not justify a price of \$8.25 per M for the stumpage, which is shown by a valuation factor of .65 to be worth approximately \$7.10. On this basis the profit margin of \$3.80 per M also shows a profit of 12 cents per dollar of costs including the stumpage. Since the trends and risk...are assumed to be about the same as in Tract E, the stumpage price of \$7.10 for Tract F is consistent with the \$8.25 bid in Tract E, and will afford approximately the same rate of return to the operator. (p. 494)

All this is rather ingenious and interesting, even where disagreement might be entered. In the first place, Rothery initially argued that the purpose of appraisal was to determine market value. One might think, therefore, that rather than taking an intermediate bid, as he has done as representative of market value, he would instead select the actual successful bid, Bid 1: Surely Bid 2 was not representative of market value and instead, denotes a bid that failed and thus no more reflected market value than the bids of other unsuccessful buyers, including those who did not bid for Tract E in the belief that they could not possibly acquire it. (Rothery

does not tell us of the appraisal procedures previously used for Tract E which in themselves might have tended to limit the number of bidders.)

Rothery's use of the profit ratio (profits to costs) from the intermediate or median Bid No. 2 to apply in the appraisal of Tract F might be even more questionable. For his entire argument, that this bidder considered a stumpage price of \$8.25 adequate, should have led to the position that the bidder considered an absolute return of \$4.15, as an allowance for profit and risk, to be ample, to give him "an adequate return on his investment whatever it might be." It must be that the operator thinks in terms of the absolute sum of profits and relates these to his investment base, as providing the wherewithal for dividends. If the equipment used is about the same, then the appropriate profit sum is not an unchanged profit ratio relative to costs and stumpage, but that profit ratio which leaves the same absolute level of profits as previously. It would seem that this conclusion is most consistent with Rothery's general argument at what appears to be its crucial stage.

One or two further propositions ought to be culled from Rothery's effort to outline his appraisal technique. Rothery suggests that as a guide to appraisal the bid-data ought to come from "the results of a number of recent sales of generally comparable timber to several mills. These sales were for substantial volumes, which tends to eliminate wild or ill-considered bids" (p. 496) He argues that even though the species composition and logging costs are different, there is a significant constancy in the ratio of all costs to aggregate selling proceeds (that is, in the operating ratio).*

Rothery demonstrates that the use of an average valuation factor yields large discrepancies in profit margins so that, to avoid this, each species should be valued to yield a consistent or common profit ratio "on the assumption that the risks for each species are of equal degree." (p. 498) He suggests, though he does not explore the possibility, that there may be "differences among the species in the risk incurred, and the profit ratio should reflect these differences." This last point suggests that the technique cannot be universally applied on a singular basis. Concluding, he explains that he has been concerned with "some aspects of appraising stumpage in markets created by existing mills of similar type, and where the investments have been partially retired and fair competition has set the level of stumpage values." (p. 498)** He also declares

* At this point, too, Rothery might have argued for a constant profit margin, rather than a constant profit ratio.

** Underscoring mine.

that "there will be many cases where an appraisal will require that the investments in plant facilities, equipment, and working capital be specifically considered and a reasonable rate of return on these investments carefully calculated." (p. 498) In short, he did not view his technique as universal and all embracing, without amendment, to all types of situations.

Issues in Transactions Analysis

The Rothery analysis is interesting in that it does try to compute the economic value of stumpage from objective data and, in the area of indeterminateness, namely, with respect to dividing the conversion value between stumpage and profit allowance, seeks to draw on bidding experience to impart less arbitrariness to the results. Inasmuch as any endeavor to utilize bidding experience is likely to encounter much the same problems it is well that we examine the technique at some length, evaluating and analyzing the various problems and alternative approaches at almost each step, considering merits and shortcomings and, perhaps, indicating situations and circumstances in which the whole approach may be inapplicable.

We shall divide the analysis into separate studies of the problems of deriving lumber prices, the accumulation of cost data, and the construction of the profit ratio.

The Derivation of Lumber Prices

What lumber prices ought to go into the computations of an appraisal? Right here several alternatives present themselves.

First, there is the question of whether some past prices ought to be used or whether these ought to be corrected by some explicit forecast of future lumber prices. In this problem there is the frequent issue encountered in all decision-making processes, of whether some definite rules with a minimum of judgment, or more judgment with less rules ought to prevail. Usually administrators will prefer the former, especially so in a case (such as is being described) where the work of appraisals will have to be assigned to numerous individuals.

Thus in a resolution relying on rules, appraisals will ordinarily have to be tied to some past data, some past prices. So long as this is so, it will usually be most suitable to use prices referring to the very recent past, perhaps the last month or, where this is not feasible, or where seasonal influences play a part, the last quarter-year. In general, the reliance on

past prices is likely to lead to poor results only when important price trends are in the making, tending to understate the value of stumpage in a period of rising prices and overstating it in a period of falling prices.*

Once it is agreed that past prices are to enter into the appraisals, with a minimum of judgment or forecasting either implicit or explicit, questions immediately arise on the nature of the price data to be used. Considering a particular stand of timber being offered, ought some nationwide, regional, or local lumber prices be used? Inasmuch as the Forest Service is endeavoring to ascertain the market conditions for its timber, its estimates must be based on the lumber prices that will be received by its customers, by those who will make use of the stumpage, or those who could conceivably utilize it. Potential users will have to be decided on the basis of known information; hence the lumber price estimates ought to be derived from the sales markets of those firms who can, or may, bid for the particular offering. Normally, insofar as the available price records of such firms relate to earlier sales, these prices will, as a rule, have to be corrected for more recent price phenomena, as indicated by price index numbers for lumber. A modicum of judgment will thus enter at this stage, in making adjustment for more recent trends.

But this hardly resolves all the price problems for if there are several prospective bidders, say, five firms and price data is obtained from each, and if the amassed price information differs, there is the question of how the data is to be used.

The various statistical problems of deriving a meaningful average enter at this point. If the price realizations are approximately similar, with no more than a difference of about 10% separating high-log firms, a straight-forward arithmetic average is likely to prove serviceable as the meaningful price to enter into appraisals, corrected by index number information to bring the data as near to date as possible.

Alternatively, a median price can be used after arraying the realizations for the potential bidding firms; in the situation envisaged there is likely to be little difference between the

* Some partial offset occurs through the interim adjustments of the Forest Service, which tends in part to eliminate some of the impact of a falling trend and recaptures some of the price gains of a price upswing.

two. Insofar as the realizations are widely disparate, an arithmetic average is likely to give more weight to the extremes than the median: where an even number of bidders is expected an average of the two median prices might then be used. It might be surmised that in the usual situation the limited dispersion of the data will be such--so far as price facts go--to permit the arithmetic average to be used.

Thus the main point so far is that the price data ought to be confined to those firms likely to bid, or conceivably able to bid, on the particular stand being appraised. Special problems arise when either only one firm is a likely, or even possible bidder, or when the different firms contemplate different end-product uses for the stumpage. A moment's attention might be given to each of these matters.

Where the different potential bidders contemplate different end-products, though ultimate dry lumber represents the chief sales outlet, appraisals could reasonably proceed on the latter basis. If all firms contemplated the same end-product, but one different from dry lumber, new difficulties appear; principle would seem to suggest that appraisal be based on the actual contemplated product out turn. Cases of different products by each firm also arise; there seems to be little profit in pursuing the problem at this time inasmuch as it involves a matter of special cases that will have to be handled differently, with a knowledge of the specific elements arising in the more common situations.

When only one firm is the likely bidder the problem of whether to use its realization prices, or some average, must torment the appraiser. If the aim is to predict the economic value of the stumpage to the purchaser, then the actual realization prices of the one prospective purchaser ought to be used. However, inasmuch as in the multiple-bid situations some average is used, indicating that the actual price of the final successful bidder is unlikely to be the same as that entering into the appraisal, then for the one-bidder situation it would also appear that some average of realization prices ought to be utilized. Either these may be secured from those firms which are regarded as the chief competitors of the single bidder in sales markets or, if this is regarded as involving an excessive amount of judgment and market analysis, the alternative would be to use realization prices of firms in the most nearby areas, averaging them in the way indicated above. Differences in costs, such as in the transport of lumber to selling markets, can be allowed for under the cost heading.

Thus the problem of deriving meaningful price data seems susceptible to fairly simple resolution, with the main issues hinging upon whether a median or arithmetic average ought to be used, and how to handle the potential single-bidder case as well as those situations in which diverse end-products are contemplated by the multitude of bidders.

The Use of Cost Data

The accumulation of appropriate cost data presents most of the same problems as arise in the case of prices, once agreement is secured on the content of the cost category; the latter, it is well understood, represents a complex of elements not subject to the same degree of acceptance and definiteness as with prices. Still, most of the more serious differences are likely to be confined to the treatment of depreciation; more will be said on this later.

Cost phenomena are likely to be both more widely dispersed than the price data and are less likely to be available on as current a basis. Both of these matters invite comment.

In the case of costs, insofar as the efficiency of firms differs, the spread between superior and less efficient firms is likely, as a rule, to be more marked than in the case of sales realization prices. Insofar as the number of prospective bidding firms are rather few, if the cost experience between high and low is of the order of upwards of 20%, one reasonable solution might be to concentrate on the median cost experience or on some averaging of those firms which fall within 10% to 15% about the median. Ordinarily this ought to prove adequate in getting at some representative or reasonable appraisal data if at least three firms remain among which an average can be derived by computation. Otherwise, more weight might have to be given to the extremities of the cost distribution, with all firms included and averaged. But these are particular problems; where they arise some help can be secured by drawing on the principles of statistical theory--and some rule of discretion.

Valid cost data would also require rather frequent access to the cost records of firms, and often require information in advance of the time it is drawn up and prepared by the firm's accountants. Even under the most favorable conditions, therefore, the cost data available for appraisal work is likely to be of older vintage than the price realization information. Too, the situation is not greatly helped by the use of index numbers for the construction of cost indices are a more difficult matter, and may well lead to cruder results than is usually the case with price indices. Still, some efforts might be made in this direction, at least towards following rather closely the wage and productivity trends in lumbering in view of the importance of wage costs in the scheme of things; earlier we noted that they bulk larger than in most any other major industry.

The problem of integrated firms and/or firms contemplating different end-products arises again in this context; no recommendation or consideration of this case is offered at the present time. More germane immediately is the single-bid situation.

What is in mind is not merely the case where only a single bidder arises at the actual appraised price, for conceivably several firms in the region might have been purchasers though because of their estimate of market conditions or because of their possession of ample stumpage from previous contracts they fail to enter a bid on the new offerings. In this event the latter firms can be included in the averaging process as potential, or likely, or conceivable, bidders on the stumpage; for appraisal purposes this instance need not be regarded as a single-bidder situation. The more difficult and vexatious case is that in which there is only one likely bidder in the region for the particular stand offered, or for other stands that might be put on the auction block. Other firms, because of geographical factors, are supposed to be precluded by virtue of the distance and the extra costs involved.

For this situation it might be unreasonable to use cost data of merely the most accessible nearby firms, for these, by hypothesis, are not competitors at all for the stumpage. What might be done, instead, is to use cost data for any other comparable firms in the entire forest region; comparability in this context might be envisaged as measured in terms either of annual output, investment (actual or prospective for the particular firm), or in terms of the number of employees. If information for a half-dozen or more firms are secured on this basis, and after making allowance for any special cost factors in the case of the particular firm for which the stand is being appraised, the cost data might then be averaged and included on the cost side for appraisal purposes.

Much the same procedure would always seem to commend itself whenever the number of prospective bidders on a particular stand amounted to two or three firms. In this way the particular firms would be measured by standards of efficiency in the industry at large, rather than in their immediate environs, with some special weight given to local conditions which either entail higher or lower cost experience.

The Profit Ratio

Whatever the difficulties, dilemmas, and divergences of opinion with respect to price and cost data, the problems are literally simple compared to the use of a profit ratio in order to split up the conversion return and render the stumpage value determinate. The important issues in this respect are as follows: (1) whether a uniform profit ratio ought to be used in a given region (or over all competitive regions) or whether the profit ratios ought to differ, or be identical only fortuitously, between different zones, forests, or areas; (2) whether the profit ratio ought to be fixed independently of bid experience; (3) if used, how bid experience ought to be applied in altering the profit ratio; (4) whether criteria other than the bid

experience ought to govern changes in the profit ratio; (5) the frequency with which the profit ratio ought to be altered; (6) whether the profit ratio ought to be related to the size of the offering. Let us consider these questions in turn.

Firstly, it ought to be remarked right at the start that the relevant issue concerns not the setting up of an original "first" profit ratio to rule in stumpage transactions, but instead the question is of how it is to be altered in the future; the Forest Service is a "growing concern" with a record of substantial success in marketing its products despite its differences with its customers on its prices. The problem is thus one of how the profit ratio ought to be altered in the future to accomplish the marketing objectives of the Forest Service.

By the profit ratio we can, of course, mean either the ratio of profits to costs plus stumpage--which seems to be the most typical use of the concept in Forest Service literature--or as the ratio of profits to sales. Actually, one ratio involves the other, quite automatically; given one it is always possible to derive the other.* The concept of profits to costs seems to foster the belief that the earnings ratio in which the firm is interested is a fairly fixed proportion of total costs, as if the firm is entitled, in a way, to earn something as profits on each dollar of costs. The profit-sales ratio, on the other hand, seems to suggest that on each dollar of proceeds the firm expects to earn some profits. Although this slight difference in interpretation suggests itself there is nothing really to favor one usage over the other in the light of the fixed relationship of the two. Economists, it may be suggested, would ordinarily prefer the relation involving sales in the thought that earnings flow from available proceeds, not because costs are experienced. But this is neither a profound distinction nor a crucial issue.

A Uniform Profit Ratio

Consider, now, whether a uniform profit ratio (in either interpretation) ought to prevail in all appraisals. If it is not uniform, stumpage is being offered on better terms in some areas, holding open the possibility in strict principle that if a sale is actually made at the appraisal in certain areas profit results will be better. As it is generally argued that in stable

* Writing $P - (C + R) = 0$, where P represents price, C , unit costs including stumpage, and R denotes profits, then:

$$\frac{R}{C} = \frac{P}{C} - 1$$

$$\frac{R}{P} = 1 - \frac{C}{P}$$

conditions there are tendencies for earnings to be uniform throughout the economy, this proposition would seem to counsel a uniform profit ratio to be applied to all transactions in which appraisals are made. The ratio would have to be uniform for the entire region, and between regions where the boundary line is in fact artificial and the lumber operators are in fact in competition, in logging and selling lumber.

But this notion of uniformity has to be interpreted with some care; economists would be quick to point out that if there is some difference in risk or in the volume of equipment used, say because of differences in the terrain, weather conditions, or the certainty of operations because of labor stoppages, then a uniform return would in fact be inequitable, involving a spurious equality while the actual outcome would be unequal. Differences in these elemental conditions, once the principle of a uniform profit ratio was accepted, would thus sanction some actual diversity in the profit ratio either between regions, or different areas or zones within a region.

One further aspect of non-uniformity suggests itself. Insofar as the Forest Service is interested in fostering logging within a particular forest or area, where cutting has been retarded because of the fewness of operators located within the area, there is every reason to depart from the principle of uniformity and to enlarge the profit ratio in order to accommodate felling and forestry objectives.* Similarly, if it wishes to delay cutting operations in a region, aside from a refusal to make timber available--which can always be protested as dictatorial--the means for doing so lies in a stiffening of appraisals, entailing a reduced profit ratio.

This very discussion, and advocacy of a uniform profit ratio (within limits), thus suggests that in contrast to the assimilation of price and cost data from the prospective buyers of the particular stand, the relevant profit information consists not in the earnings record of the particular firms that may bid on the stand being put up for offer but instead, refers to the characteristics of the entire industry.

The Use of Bid Experience

This last remark leads directly to the question of whether the profit ratio ought to be fixed independently of bid experience or not, and if it is to rely on bid experience, just how the latter is to enter into the scheme of things.

* See Part I, pp. 23-26.

✓ If the profit ratio is always settled outside of bidding experience it does imply that despite the continuous reading in the market of what buyers are willing to do, and what profit margins they will accept in spite of Forest Service calculations, the information would be sedulously and studiously ignored. It would be as if we always find that our actions are in error--appraisals in this case--and yet refuse to correct them despite useful signposts on how this might be done. Bidding information does constitute the check on the tentative efforts to establish appraisals that are effective in moving the timber and maintaining the industry balance for the longer run objectives of the Forest Service.

Viewed in this light, an appraisal technique that failed to utilize bidding experience would be discarding important signals which reflected purchaser attitudes. An auctioneer who failed to recognize the implicit estimation of value when in successive transactions, say on different days, buyers bid about the same sums for particular objects put up for sale, would usually be regarded as derelict in his understanding of consumer valuations and market phenomena.

Once it is agreed to utilize bidding experience the manner in which it might be incorporated into appraisal work becomes an immediate issue; ways to use it are rather numerous. In the original Rothery illustration--though he is not explicit on the point--presumably all of the bidders on Tract E (from which he derived the profit ratio for the appraisal on Tract F) bid a sum in excess of the appraisal. In some accounts of Forest Service use of transactions analysis it has seemed that this was the interpretation to be placed on bidding experience for use in appraisals.

Clearly, the effect of using median bids where appraisals are announced, and thus the only bids forthcoming are those in excess of appraisal, would be to drive down the profit ratio through time--unless the overbids are regarded as too small as to warrant tampering with the profit ratio. Effectively, insofar as the only bids or market evidence available would consist of offers in excess of appraisals, a truncated median is obtained, one applying not to all firms that might have bid on the stand if the appraisal were unannounced but consisting only of the bids of firms valuing the stand highly enough to bid a sum on it in excess of the appraisal.

To circumvent this, the only way a true median bid and implicit profit ratio could be secured would be if the appraisal figure was unannounced so that bids below, as well as those above, the appraisal would be at hand in order to check the reasonableness of the implicit profit ratio used in the appraisals. It was observed earlier that unannounced appraisals might be considered in the case of prospective single-bidder situations; they would also seem to have their place, at least for occasional use, in

order to check on the validity of profit margins in appraisals even in potential multiple-bid situations.

Thus the use of the median bid where appraisals are announced is objectionable for it is likely to lead to ever dwindling profit allowances in appraisal work. If appraisals continue to be announced, bidding experience can obviate this shortcoming if the profit ratio is altered only if overbidding runs to some prescribed figure above appraisals. For example, it might not appear unreasonable to suggest that appraisals were not too wide of the mark if successful bids were within 10% of appraisals. Thus where sales hovered in a price range at about 10% above appraisals it might be contended that the latter were fairly accurate harbingers of market valuations. Where in competitive situations, in the sense of several multiple-bidder cases, bids fell closer to 5% of appraisals, the intimation would be that appraisals were "tight"; information on sales that encountered no buyers would also be important in this regard whenever overbids, after casting out special circumstances of cutthroat competition or tax motivations, tended to run 15% to 20% or higher in excess of appraisals then the signs would point to an unduly favorable profit ratio and greater zealously on the part of operators to acquire stumpage, counseling some reduction in the profit margins used in appraisals.

In this suggested use of bid data, actual successful stumpage bids were in mind; if the median bid (on announced appraisals) was used, and the same 5% to 15% figures utilized it would, of course, mean that market phenomena of actual price proceeds were even more in excess of appraisals than these percentages indicate. To ensure a continuance of situations in which more than one bidder appears, the figures might properly be taken to refer to the median rather than to the successful bidder. On the other hand, if appraisals were unannounced then the interpretation could be in terms of successful rather than unsuccessful bidders, the winning rather than the unsuccessful median bidder.

On the assumption that announced appraisals are destined to remain, due in part to the difficulties in the way of making such a great departure in selling techniques, the next question concerns the organization and classification of bid experience for appraisal work and as a check on the accuracy of the profit allowances used. In a way this question involves the matter of the frequency with which changes are to be made in the profit ratios to be used in appraisals.

The Frequency of Change in the Profit-Ratio

Inasmuch as the total number of cases large enough to give significant readings to the FS presently, and in the near future, amounts to about 600, it would seem that changes in the profit

ratio made on the basis of less than 50 or 60 cases would, in the usual course, be unwise. Further, these cases must refer to the rather recent past in order to justify extrapolation to the near future. Hence, it would hardly seem feasible to consider altering the profit ratio other than by quarter-years, say; of course, it could be done monthly, in the light of information constantly accruing and yielding clues to the recent past. The drawback would seem to be that the effectiveness of a particular profit ratio might not then be exposed to enough cases and situations to test its market acceptability. Opinions can well differ on this; it appears to the writer, however, that a profit ratio that is not reconsidered for reasonableness at least every 6 months becomes rather rigid; on the other hand, altering the ratio more frequently than every 3 months would fail to give the ratio an appropriate life to test its adequacy for the price job. Altering it more frequently might also impart an element of speculation in bidding on timber stands, to hasten or retard bids and acquisitions of stumpage to those weeks (or months) in which the profit ratio was expected to be most favorable to the purchaser.

As to the mechanics of using the bid experience, the problem would run about as follows. If median bids rather than successful bids are used, insofar as these run to about 15% above appraisals, then in order to bring them closer to 10% above, the profit ratio would have to be lowered on subsequent appraisals in order to compare with prices based on the old profit ratio. To extract the median bids, either all of them could be arrayed and "the median of the medians" used as the test of the appropriate profit ratio to appear in appraisals, or all the medians can be averaged to derive an arithmetic average of the medians. Alternatively, and to give weight to the size of the sale in signifying a meaningful overbid, the absolute money sum of the median bids can be added, and then compared to the absolute aggregate of the appraisals in order to derive the average aggregate median overbid.

Which average should be used would lend itself to separate study; it would depend on the homogeneity of the data, that is, on the average size of sales and the dispersion or skewness in the array of median bids. The study of this question ought to be carried out in the light of the actual overbid data, rather than in abstract general terms.

One further point may be made here. If single-bidder situations are expected, as a compensation of the lesser competition, a somewhat lower profit ratio might be justified in the thought that, say, as a rule appraisals are 10% to 15% below market valuations.

Non-Bid Phenomena and Changes in the Profit Ratio

While some remarks on the frequency of changes in the profit ratio have been proffered it remains to comment on whether phenomena other than overbid experience ought to influence modifications in the profit ratio used in appraisals. Several matters suggest themselves at this point.

As in assessing bid experience overbids coming from instances of economic warfare are to be eliminated from consideration, or heavy bids stemming from the incidence of tax laws are to be ruled out, confirms the need to consider elements other than the unfolding bid phenomena in deciding on the appropriate profit ratio. Ultimately, it is at this place, in this stage of appraisal procedure, that judgment must be combined with past fact in judicious measure.

To illustrate, it has been pointed out that appraisers, and their administrative superiors, will in all likelihood want to rely on recognizable facts whenever possible rather than judgment; from price and cost records they will be able to obtain data on these magnitudes with guess-work reduced to a minimum: for price and cost calculations, therefore, the recent past will thus be projected onto the future. Suppose, however, overbids in the recent quarter-year have been rife, though they have fallen from the previous quarter. On a crude application the theory of overbid experience the times would thus seem propitious for a new reduction in the profit ratio. However, the decline in the scale of overbids may itself be a reflection of some heavy tendencies in the lumber market, of prices that have started to fall and are expected to sag. In this case it would appear to be imprudent to reduce the profit ratio for the forthcoming quarter-year, for this could be just the blow that would lead to a backing-up of stumpage offerings, of refusals and rejections at the appraised price. Thus it is in entering the profit ratio to be included in appraisals that some predictive elements must enter; it is at this point that judgment on future events will in some measure assert itself. Whether the exercise of this judgment can be circumscribed by carefully stipulated administrative rules, and still succeed in accomplishing the goals of policy, is a moot question. In any event, since a fairly uniform ratio is to be used in the region, or over several regions, the exercise of judgment at this point will be in the hands of the administrative topside, presumably the most experienced of the personnel and those delegated with responsibility for decision-making tasks. There are no obvious rules to prescribe for the exercise of such judgment; insofar as some forecast is involved it will have to proceed on what amounts to an intuitive basis after the registry of the vast variety of market data and market views imparts a certain "feel" for the future in the minds of the responsible officials and market analysts.

Thus alterations in the profit ratio will come not only from a reading of bid experience but from the exercise of judgment on what the future portends by the most experienced administrative personnel. There are other situations in which even a record of heavy overbids will not necessarily countenance a decrease in the profit ratio.

One such situation would occur in the case of an overexpanded lumbering industry which could not get all the timber it wished because of its unavailability; of course this could lead to strong overbids on the part of firms seeking timber for mere survival; this case obviously has overtones of cutthroat competition. Here, with numerous bidders it would appear that the competitive market forces would ensure appropriate prices so that the profit ratio could be retained, for appraisal purposes, at a more reasonable longer-run level, one that could prevail after some firms had succumbed to the market stresses. Some difficulty would arise in transactions in areas with fewer bidders, or even a single bidder. A failure to lower profit ratios in the latter case would amount literally to favored treatment for the firm merely because it was insulated from competition. A partial rectification would counsel some reduction of the implicit profit ratio to give some heed to the difference in the survival facts and the inequitable struggle; otherwise, some advantages are being "built-in," as it were, by the Forest Service due to the accident of location. Thus where the Forest Service is reluctant to lower profit ratios further in highly competitive areas because of a belief that they would then be incompatible with the aims of long-run price policy, the same reticence and reluctance ought not be extended to market areas where competition is a good deal more limited and the profit position of individual firms is already ample--as judged by other evidence. Failure to price higher in the latter cases constitutes some gratuitous bounty to such firms which is not necessarily consonant with long-run needs. In an overexpanded industry pressure for contraction in the industry size rightfully belongs on the full group, not only on those firms which must acquire stumpage after fierce competition in their area. Otherwise the business failure and departures will be confined almost wholly to certain zones, as it were, even though several of the sliding firms might, from an efficiency standpoint other than the purchase of their stumpage, be more competent than firms located in less competitive forest zones. Placing some price pressure on the latter also tests their fitness for survival; their passing when under only slight pressure can create cutting and marketing opportunities for firms of superior efficiency currently located elsewhere.

There are also other situations where the Forest Service may wish to alter profit ratios without relying wholly on bid experience. It was remarked earlier that price constitutes the lever by which production can be stimulated or contracted.

Thus, in opening up new cutting circles where few firms currently exist, the Forest Service has little alternative but to grant a more favorable stumpage price outcome to attract new firms: the profit ratio constitutes the vehicle for achieving this. As the risk factors are greater in such areas a higher profit allowance can be estenuated on these grounds.

Too, if there is some strong basis for the Forest Service to suspect collusion in bidding in some area, with firms rotating (as it were) in their bids for stumpage, or despite sealed bids and cost differences all bidding comes in at about the same level, the Forest Service would seem to have little recourse other than to lower profit ratios and raise stumpage prices to levels more consistent with those experienced after bidding in other areas of keener competition devoid of overt or tacit collusion.*

Another situation which may countenance a rise in the profit ratio will be one in which interest rates on long-term obligations have shown a tendency to rise in an important degree, of 1% or more, and hold firm at the higher levels. This is generally likely to be the case in periods of general prosperity. On the other hand, in such times stock market prices relative to earnings are likely to rise, making it somewhat easier, for larger firms at least, to borrow money through this channel, so that the need for higher earnings is somewhat blunted. However, financing in such periods will also require better earnings prospects; higher profit ratios will be compatible with this goal. Further, earnings through all industry, and ratios of profits to sales are likely to be generally higher in periods of high employment than in more depressed times: we have already noted that earnings to sales ratios strengthen during economic upswings.** Thus profit ratios that will be fairly comparable with more general experience during periods of relative business depression are likely to prove to be too low, comparatively, in periods of better business. Failure of profit ratios to rise when this is happening in practically all other activities imposes, in effect, a relative penalty on lumbering.***

There are other situations that may countenance a departure either from a uniform profit ratio or a refusal to lower it despite the unfolding bid experience. For example, in the case

* This is not to make any charge of collusion, merely to recognize the possibility.

** See above, pp. 57-60.

*** Unless the Forest Service is interested in reining-in the lumber industry, to retard expansion and contribute, in this fashion, to stability. See above.

where only a single bidder is expected it was suggested that price data could be secured from the nearest mills, as well as the existing firm, for averaging purposes in the appraisal. Cost data from mills of comparable size, it was also averred, might be secured to average-in with the facts for the existing single firm. From this comparative data a reasonable conversion return could then be computed. Thereafter, in applying the profit ratio it may be that the resulting appraisal figure exceeds what the firm is able to pay. To take the case most favorable to the firm, the average realization price of the appraisal data may exceed its actual price realization, while its costs may also exceed the computed average. In this event the Forest Service would be faced with the decision of either raising its embodied profit ratio (and lowering its appraisal price) or failing to sell the stumpage. If it is part of the timber reserve that it has decided to dispose of, there seems to be no alternative other than a lower appraisal price. In a case of this sort some application of the investment-return method of appraisal might be considered. If, after doing so, the evidence indicates an "excessive" appraisal, whatever the exact content of this term, there is no alternative to a price reduction. If the rate of return on investment at the appraised price does not seem unreasonably low, and the firm still remains unwilling or adamant against paying the appraisal price, the Forest Service faces the more nettlesome choice of withholding the stumpage or reducing price because of the inadequacies of competition. There is no easy or obvious policy answer to this question; if future stumpage is to be offered the immediate price reduction may be tolerated but, simultaneously, the stumpage opportunity pointed out to other firms, even to small loggers able to get financing assistance. If the single bidder possesses its own stumpage holdings the problem becomes even more complicated though here the Forest Service can afford to withhold the sale in the knowledge that the failure to cut according to its plan only means a hastened private timber cut in its stead.

A Major Limitation of a Uniform Profit Ratio

A related issue arises in cases where the size and intensity of capital use of firms bidding on the various timber stands differs. That is, if on all stands the distribution of firms into small and large operators is about the same with about the same average of labor to capital, then the use of a uniform profit ratio to apply to all cases, with the reservations noted above, is defensible. Suppose, however, it is established that certain sales appeal almost solely to smaller firms, others to medium sized, and still others to only the largest firms. It would appear that in such cases the use of a uniform profit ratio is a more dubious procedure.

Say that of two firms one uses, for the same volume of output, about 40 more laborers than the other firm, with the latter using more equipment, enabling it to dispense with some labor.

Say, too, that the average wage paid to the men is about \$4,000 per annum: in this case the wage cost for the firm using more labor will be greater by \$160,000 per annum. On the other hand, the firm using more equipment might have capital charges, say, amounting to \$120,000 per annum. Let us suppose, too, that this firm was typical of a group of firms bidding on larger-sized, presumably, stumpage offerings.

In an attempt to apply a uniform profit ratio in such cases the outcome would clearly be equitable, and injurious economically, to the firms using more equipment. The application of the uniform profit ratio would lead to disproportionately higher appraisals for stumpage for the firm using more equipment merely because it has attempted to cut costs and perform its operations by more mechanical, less labor-using, means.* It would be no argument to allege in this case that a more "favorable" profit ratio to it meant that it was getting its stumpage on better terms. Instead, as unit costs are likely to be lower, stumpage prices per MBF would be higher; the profit ratio alone would be higher. The fact would be that in failing to raise the profit ratio relative to less capital-using firms, the firm would be penalized for its technology and inadequate consideration given to the earnings that are required by the installation of its capital facilities.

What would seem to be required in these cases, where the average nature of capital use differs between sales, and particularly where this occurs on sales of different sizes, would be to apply a different, rather than a uniform, profit ratio. The concept of the uniform ratio applies, thus, only insofar as the amount of equipment per dollar of sales is roughly the same as between firms. It would not be applicable, and instead would hamstring the use of equipment, if a uniform profit ratio was applied despite important differences in the diverse offerings on the amount of equipment used per dollar of output. From our earlier examination of profit ratios in the field of public utilities which use so much more equipment per dollar of sales than is true, say, of trading firms, it is clear that the profit-sales ratio for the former is notoriously higher even though

* To illustrate, suppose 10,000 MBF are involved with a sales price at 20 per MBF. Say, too, in the one case labor costs are \$160,000 and other costs about zero while in the second case, expected dividends are \$120,000 and labor costs, etc., are about zero. A 10% profit margin would yield both firms \$20,000 of profits with stumpage appraised at \$20,000 for the labor-using firm and at \$180,000 for the capital-using firm. Of course this is an extreme illustration just to make the point.

ultimately, relative to the value of investment, the income ratios are more nearly alike. The same general set of ideas would have to apply, on economic grounds, in lumbering unless it is felt that capital investment and the substitution of equipment for labor has less warrant in lumbering than in other segments of the economy.

Although this matter of differing proportions of capital relative to labor, would seem to sanction different profit ratios in appraisal work, it is clear that this departure from a uniform rule would only be requisite if bidders on different stands could be clearly demarcated as using different degrees of equipment relative to labor in their lumbering operations. The argument thus might be particularly applicable in single-bidder, negotiated-type sales, where the purchasing firm is of such size and organization as to utilize less labor and more equipment per dollar of sales output than the usual average. It is for such cases particularly, unless comparable profit-sale ratio experience is available for many such firms, that the application of the investment-value method of appraisal might commend itself. If many firms using approximately the same technology can be isolated, data for an operational profit-sales ratio might be derived. Even so, such a ratio might have to be tested continuously against data on returns to net worth in order to assess its operational impact. If few such instances can be found, perhaps in the neighborhood of 50 or less, there may be little alternative other than to apply the investment-value method of appraisal. Once the appraisal has been made, so long as bids will be received and accepted from all quarters for the particular stumpage being appraised, there can be no complaint of favored treatment.

It ought to be clear that in cases such as those envisaged the direct cost of operations, of labor, etc., will be different than for firms using less equipment. Ordinarily they will be lower; hence, the conversion return will be higher and even with a higher profit ratio the stumpage price per MBF ought to be higher. It would not be equitable for a firm to claim, in its cost experience, higher direct costs than less capital-using firms and also, a need for a higher profit margin. To grant this would be to give a bounty for an inefficient mode of operations--despite the use of more equipment: there is no need to protect inefficiency; rather economical operations ought to be fostered by the appraisal technique.* In no case--by and large--ought timber stands be sold, to presumably larger

* Hence, the necessary cost data for such appraisals ought to be gathered from firms using comparable amounts of equipment per unit of output.

operators with more equipment per dollar of output, at a lesser per MBF price than smaller stands to smaller operators using relatively more labor. So long as the appraisal still includes only "average" large firms there can be no legitimate protest on the score of "penalizing efficiency." Furthermore, so long as the income returns on investment are ample (as indicated by various relevant data) protests of inadequate return on capital also will miss the mark.

In sum, what is contended simply is that where the technology of firms favors the use of more equipment relative to labor compared to other firms, the use of a uniform profit ratio leads to inequitable and uneconomic results. There is no reason, however, for stumpage in these cases to be sold at lower per unit prices; rather, the expectation would be, because of the cost savings, for stumpage prices to be higher. Conversely, the application of uniform profit ratio does not ensure uniform appraisal treatment to all bidding firms when a diversity of use in equipment marks their operations.

The Forest Service and Profit-Fixing

In concluding this survey of transactions analysis, a word might be offered on a not infrequent charge that the Forest Service fixes profits in lumbering, and also the simultaneous plaint that it does so at too low a level.

Clearly, every firm that sells a raw material, be it steel, wheat, cotton, aluminum, etc., "fixes" profits for the purchasers of it. This is in the nature of things inevitable--and not very important. Even if stumpage were given away, without any charge for it, the same criticism would hold true.

What seems intended in these allegations, however, is something else, that the Forest Service "fixes" profits at some prescribed level and refuses to budge from this position. This is hardly true, and scarcely valid. Let us see why.

In making its appraisals the Forest Service does, of course, in the usual course of things include a profit allowance. But this, as we have seen, is necessary and there seems little point in decrying it; any mode of appraisal would have to do so. On the other hand, to argue that the Forest Service limits profits to some rigid, predetermined sum is mistaken.

In the first place, we have seen that in making appraisals an attempt is made to draw on "average" price, cost, and profit experience, with the latter indicated in part by the bidding record. With respect to profits, it is true that a profit ratio is written into the appraisals. But this ratio will actually emerge as the profit outcome for a firm only if 1) it succeeded

in acquiring stumpage at the appraised rate and, 2) otherwise found itself as "average" with respect to both lumber prices and costs. Otherwise, a profit outcome exactly similar to that used by the Forest Service in its appraisals would occur only fortuitously, by counterbalancing differences in prices and costs which led to the same result. In this event it could hardly be contended that the Forest Service "fixed" profits according to some rigid preconception. With equal truth--and error--it could be alleged that through tax policy the United States Government "fixed" profits. And yet, operating under the same tax laws, we find industry operating and exhibiting a vast diversity of ultimate profit outcomes.

VII. SOME PERIPHERAL ISSUES

In this section we consider several issues inadequately treated elsewhere in this study but which often arise in discussions of Forest Service pricing and appraisal procedures. We consider first the contention that the Forest Service penalizes efficiency for the appraisal procedure tends to transform cost savings into higher stumpage prices.

The Presumed Penalty on Efficiency

It is clear that an increase in efficiency which tends to reduce costs can permit a bidder to offer greater sums for a tract of timber. Nevertheless, this hardly operates as a penalty for the logger. So long as efficiency is generally increased there is no reason for any particular logger to congratulate himself on his accomplishment: what he is doing is merely something that all are doing; especial prowess is not demonstrated by keeping pace with the pack. Thus, where there are general increases in efficiency there seems to be no substance to the complaint that a rise in efficiency merely increases stumpage prices. Part of the consequences of the improvement will be lower lumber prices, part higher stumpage prices, and part, as a rule, will mean more income to capital relative to labor. But this is the way our economy works. Agricultural developments which have raised entrepreneurial efficiency have been translated into consumer gains and real income advances for all segments of our economy, including higher land values: we need only consider how the advent of the railroad into the West affected the value of land over time. The case for private enterprise would be gravely weakened if it could not be demonstrated that improvements made by some tend to become general, leading to more output per unit of labor employed. The advantages are transmitted throughout the economy, not embedded permanently with imitators of the original innovator.

On the other hand, insofar as an enterprising firm is above the usual run in efficiency and its productivity accomplishments outrun the results realized by other firms, there is less substance to the complaint: so long as stumpage prices tend to rise according to the average improvement, and not to the more stellar performances, superior abilities would reap benefits, rather than being subject to penalty.

Something more might be said in sales where there is one bidder, amounting to negotiated sales. If in this case the appraisal did take into account only the cost phenomena of the firm, and, thus, the full growth in its efficiency, then it would follow that advantages of superior progress would be fully reflected in stumpage prices; there would then be no benefit to the firm to initiate improvements and strive for

superior performance. The correction would seem to be the simple one, to wit, that appraisal procedure must make allowance for average improvements and changes in efficiency, rather than the more noteworthy above-average accomplishments. Failure to allow for average improvements would, on the other hand, place a premium on entrepreneurial indolence and backwardness.

Depreciation in Cost Analysis

In arriving at conversion value, included among the direct costs is an allowance for depreciation, as estimated for average mills in the area. Usually the depreciation sum conforms to the deduction being made under the standards set up by the Internal Revenue Service.

The Forest Service has been subject to criticism from industry sources on the grounds that its depreciation allowances are inadequate, as being too small and unrealistic. Now insofar as the depreciation allowances are some average of actual industry accounts the criticism might be directed to the lumber business rather than the Forest Service; it would be industry practices and accountants' recommendations that are "unrealistic." Let us consider this; the criticism is basically not one of Forest Service procedures but of conventional attitudes.

From the standpoint of the economist the only depreciation that deserves to be considered among the direct costs is the actual wear and tear through use. If this can be estimated, and a present value of future income lost through present usage estimated,* the result would constitute the current economic cost of using the equipment today, rather than deferring its use to the future. The sum so arrived at is known as the user cost of current operations. Note the content of this: it consists of the actual wear and tear as estimated by engineers, and then, an estimate of the future value of the service life destroyed. Thus, if future prices are expected to decline, and profit opportunities are expected to be fewer and lower, user cost will fall. If profit opportunities are expected to brighten, user cost will increase.

In this concept of economic depreciation, any loss in the service value of equipment through the mere passage of time would be regarded as a supplementary or indirect cost which had to be recovered out of gross profits to warrant the firm staying in business over time. It would not, however, be a prime or direct cost of operations over a shorter period of time.

* See my Price Theory, Chapter 17.

In contrast to this concept of user cost and time depreciation, the practice of the Bureau of Internal Revenue is to permit firms to write off the original cost of acquiring equipment either through some straight line or more complex formula, and from time to time, under special emergency laws, to permit firms to accelerate their depreciation write offs. Under the straight line formulas it is clear that in a period of rising prices, where the replacement cost of new equipment exceeds the original or historical acquisition cost of the old equipment, the depreciation allowances to recapture the original capital sum will not enable the firm to replace its original equipment. In the inflationary period of the recent past, therefore, it has become commonplace for industry to protest that the permissive depreciation allowances were inadequate.

Manifestly, this argument constitutes a two-edged sword. If replacement costs become the appropriate index for depreciation calculations then, in a period of falling prices replacement allowances will fall below calculations on a straight line original cost basis. It is doubtful whether industry will advocate replacement cost as the depreciation basis in an imminent period of declining prices. If the replacement method of depreciation is adopted, therefore, it ought to be clear that it is meant to apply in all price level circumstances.

What ought to be the appropriate depreciation technique in the cost analysis of the Forest Service? There is, unfortunately, no really correct answer aside from the user cost ideas developed above--and these are so immersed in subjectiveness as to prove unusable for Forest Service purposes. Any other scheme would correspond to accounting conventions rather than economic perception. There are no unassailable arguments to favor either historical cost, present value, or replacement value, as the write-off basis according to straight-line or other formulae. What alone would be called for would be a consistent method continued from year to year. If industry advocates a replacement basis, there are no firmer arguments for it than for an original cost insistence, as required by the Bureau of Internal Revenue. Analogously, the latter's predilections do not rest on a stronger theoretical foundation than a replacement cost premise.

Considering that original cost procedures have been utilized heretofore in conformity with Internal Revenue postulates, one reasonable arbitrament by the Forest Service of the difference of opinion here--one on which an absolute standard of rightness is non-existent--would be to permit industry to average both original cost and replacement cost valuation and use the derived estimate in future direct cost studies. In toto this ought not to affect the results too greatly; as the greater part of the postwar inflation is probably behind us,

as equipment is replaced through time original cost estimates and replacement cost ideas will tend to approach one another more closely. Parenthetically, it might be observed that in public utility rate making procedures the courts have not been averse to averaging original cost and replacement cost valuation totals.

If the Forest Service wishes to defend and maintain its present approach, the stipulations of the Internal Revenue Service on this matter would seem to constitute a good guide, unless industry is willing to argue that the figures it reports to stockholders as net profit are a fictitious and an unreasonable estimate. If the latter view is actually held by industry spokesmen, then the great debate will begin, on whether it is the objective of the business firm to maximize profits over time or to maintain its capital-value intact. If the primary objective is the former, then it is the user-cost notion that becomes paramount, and not the idea of valuing capital at its replacement value.

Two further observations ought to be made before closing. Whereas original cost figures represent a definite, non-arbitrary sum, replacement costs represent a valuation concept, almost parallel to the stumpage appraisal problem. Costly valuation surveys and tests of the accuracy of the replacement data will undoubtedly rise to trouble the Forest Service if this approach is used though the difficulties may not be insurmountable if approached (with some tentativeness) through the use of price index numbers.

If depreciation charges on a replacement basis are included in the cost data prior to arriving at a conversion return, as greater allowances are permitted industry under this heading, claims for a more ample profit margin to provide for the replacement of equipment will be weakened. Greater returns via the cost calculations will entail smaller needs via the profit out-turn.

Do High Stumpage Prices Cause High Lumber Prices?

Time and again the idea is expressed, with some heat and conviction, that high stumpage prices are the cause of high lumber prices. As this argument has appeared to gain some currency it is well to analyze it; involved is a basic issue whose resolution must affect our outlook on lumber price phenomena. Restated, the question is whether high lumber prices cause high stumpage prices, or whether high stumpage prices cause high lumber prices. Put in this way an economist will recognize that the issue goes back to the discussions of classical theory, of whether high rent causes high corn prices or whether high corn prices lead to high rents. Universally, the answer of the classical economists was that rent was high because corn was high, and not the other way around. In essence, the same conclusion will emerge from our consideration of stumpage prices.

Consider the problem. Suppose one owned a shoe store and decided to pay a high rent for the shop because of ignorance--or because the property was owned by one's brother-in-law. Would this enable one to charge higher prices for the shoes? Surely, if shoes were sold on a competitive market their prices could not be affected: the only result of the foolish rental bargain would be to dissipate profits or invite losses.

Much the same story holds with respect to stumpage prices. The demand for stumpage, it was argued earlier, is a derived demand, a demand that emanates only because lumber and wood products are wanted: otherwise, there would be no purpose in felling and processing the trees. If lumber and wood products are in high demand and their prices are high relative to other processing costs, the price of stumpage will be high--and not otherwise. (See Part I.)

To make the point, consider what would happen if the price of stumpage were to rise drastically, say by 100% or more. If the demand for wood products remained unchanged the price of the timber sold as lumber must remain unchanged: there is no reason to assume that those selling lumber or wood products were not already getting maximum prices for their output for, if they were not, then the demand for lumber at the going prices would have been in excess of the supply--and there is scarcely evidence of any such phenomenon over the period since 1956. It would have been possible, if there was an original excess of demand, to have raised the lumber prices and more easily recover the high stumpage costs. Thus this argument collapses; it is not plausible to insist: "That high prices on stumpage are the principle causes . . . of high prices on lumber."

Curiously, the same individual who proffered this argument (in the Hearings) complained that substitutes were cutting into the market for lumber. But if this were the case then lumber prices could not have been raised, that demands were not outrunning supplies, and that high stumpage prices, because of the presence of substitutes, cannot constantly raise lumber prices. One elementary proposition of economic analysis is that substitutes prevent, or at least limit, a price rise. If this theory of high stumpage--high lumber had any merit it would imply that in the period since mid-1956, when lumber prices were steadily falling, all that one would have had to do to have arrested the price deflation would have been to raise stumpage prices! This does seem slightly fantastic: it would call for rising stumpage prices on a falling lumber market and falling stumpage prices on a rising lumber market; this position is hardly likely to commend itself to the industry and one most unlikely to emerge on any really free market.

Stumpage Prices and Waste

It will not be amiss to remark briefly on the relation between stumpage prices and timber waste for concern is often expressed on wasteful cutting practices or failure of operators to utilize to best advantage all the stumpage accruing to them after a successful bid. In general, once the bid is won and cutting begins, the willingness of loggers to utilize the timber will depend on the relation of direct costs and lumber prices. If this relationship is favorable, so that important profit opportunities exist, cutting operations will be careful and economical. Contrariwise, when the ratio of direct costs to lumber receipts approaches one, there will be less incentive to utilize timber in view of the narrowing direct profit margin. Thus, in periods such as the 1930's, it would not be surprising to find wasteful cutting practices. In contrast, in most of the postwar years there was strong incentive to cut economically.

Stumpage prices seem to play little or no role in all this for once the stumpage price is paid there is little to do but to treat the outlay as an overhead and then, try to maximize the difference between direct costs and sales receipts. The one qualification would be that insofar as stumpage prices are high, then the margin between direct costs and sales receipts become more important in determining the ultimate profit and loss on operations: high stumpage prices will lead operators to seek out all possible avenues in which immediate profits can be recouped. Apparently, the combination of events most conducive to careful cutting practices will be that in which the margin between direct costs and lumber prices is high and stumpage prices are also high. Events least conducive to economical cutting patterns will be low stumpage prices and narrow margins between direct costs and lumber prices.

Thus it is difficult to see how high stumpage prices can be changed with responsibility for timber waste unless what is in mind are cases where fire-or storm-damaged timber has not been sold due to excessive appraisals. This would be admissible as evidence of waste--if it can be shown that these situations frequently occur and stands of usable, though rotting, timber were not utilized.

Is the Forest Service a Monopolist?

Frequently, in the Hearings and elsewhere, there is criticism of the Forest Service as a monopolist in the timber market. In view of the pervasiveness of this viewpoint it deserves to be explored in some detail.

In the first place, it is possible to demonstrate that in the lumber market, viewing the nation as a whole, the importance

of the Forest Service stumpage is rather small, amounting to about 10% of the total in the years since 1950.* It is of course true that in certain species and in certain areas, such as Regions 5 and 6, the importance of Forest Service holdings may be more important than these comprehensive data indicate. Still, for California, for the year 1956, tentative studies indicate that Forest Service stumpage, by volume, accounted for about 18% of the total. According to some private estimates, for 1954, in the log harvest for the Douglas-fir region of western Washington and Oregon about 18% of the volume cut came from national forests.**

The facts thus do not point to the dominance of Forest Service stumpage in the timber market and ultimately, in the price of lumber. It is possible, thus, that the monopoly argument has been overstated. Still, granted the importance of Forest Service stumpage in certain areas, and these facts have not been in dispute, let us take the extreme case and suppose that all of the timber came from the Federal preserves. Would this situation be one of "monopoly"? This ought to be developed in terms of economic analysis rather than in emotional terms which seem to equate monopoly to sin. The fact is, that the consequences of "monopoly" are entirely a matter of the behavior of the seller. Action rather than power is as important in economic analysis as it is in the law: the mere power to inflict bodily injury is not a reason for a criminal charge; a violent act is.

First, consider the case where monopoly is used to signify merely a single seller. This is not a very meaningful use of the term, for wherever there is a single seller there would be "monopoly." On this interpretation, for every trade-marked or patented good, so that only the particular firm could produce and sell it, then we would have "monopoly." The definitional upshot would be that every firm selling an industrial good would be a monopolist.*** This interpretation makes a travesty of the word monopoly, for we ultimately end up arguing

* A comparison of the volume of timber cut for all forest products from national forests to total timber production for lumber uses indicates ratios ranging from 9% to 15%. These, of course, overstate the importance of the Forest Service stumpage.

** W. D. Hagenstein, Hearings (1955), Part I, p. 1019. His statement on H. R. 9821 in 1957 discloses essentially the same percentage.

*** See Edward Chamberlin, The Theory of Monopolistic Competition (Harvard, 1933) and Sidney Weintraub, Price Theory (Pitman, 1949).

that every firm is a monopolist, which means that rather than calling the firm a seller, we give it the more grating name of "monopolist."* There is little reason to misuse the term this way, to equate the term monopoly with the fact of a single seller. All of us would, and must, agree that Westinghouse is the only producer of Westinghouse TV sets; this is not to say that it enjoys a "monopoly" position. The illustration could be multiplied: what is essential in the monopoly concept is not that of whether there is a single seller of a particular article but of the variety and quality of substitutes. And for timber, as the data show, there are very important alternate sources of stumpage; the Forest Service does not enjoy the unique position assumed by those who are so quick to allege "monopoly."

Overlooking these aspects of substitutes, both reasonably close and more remote, suppose for the sake of argument that the Forest Service is the sole supplier of stumpage and is, in this sense, a "monopolist." Let us assume that the Forest Service decides to throw onto the market, through its decisions on conservation and forestry practices, a total of 10 billion BF of lumber per annum and that all of it is sold. Suppose now, that instead of this amount of stumpage being available in Forest Service stumpage, it was instead available in timber preserves owned by 10,000 independent private sellers and that they too decided to throw the same amount of timber onto the market. Will there be a difference in price merely because in the one case there were 10,000 sellers, and in the other, merely one? To say there would be seems to be a nonsensical conclusion; it is safe to say that all of economic analysis would incline to the view that if a given quantity of output is to find buyers, 10 billion BF in this case, the price must be the same whether there is one seller, two sellers, or thousands of sellers. In economic analysis this problem would be recognized as one of pricing a fixed stock of goods: whatever the number of sellers the problem is to reach a price at which the allocated amount of timber will find buyers. Hence, the suggestion that monopoly somehow leads to different consequences than "competition" when there is a fixed amount of timber waiting to meet buyers is simply a confusion.

Consider now the conditions under which the number of sellers would be important. Suppose it could be shown that with 1,000 sellers the full 10 billion BF would be thrown into the market but, with one seller, while the total offering will not exceed 10 billion BF it might fall below when, by doing so, and in the face of inelastic market demand, the result would be to increase the total of sales proceeds of the single seller.

* See Joan Robinson, Economics of Imperfect Competition (Macmillan, 1933).

In this case the criticism of "monopoly" would be quite legitimate for the seller would be striving through price policy and sales offerings to control the market price in a fashion that could never be true of one small seller among 1,000 or 10,000 other sellers.

Everything hinges, then, on the market behavior of the single seller; whether the consequences are exactly those of competition, or whether price is higher and the production is lower, as under monopoly, depends on the seller's conduct. So far there has not been any evidence to suggest that the Forest Service has so manipulated its offerings as to maximize the aggregate sum of proceeds to it. The facts seem to be quite otherwise, to wit, that the volume of offerings has approached pretty close to the total that could be processed with funds available and in the light of the difficulty of opening new areas because of the access road situation. Relatively few cases appear in which the Forest Service has withdrawn timber from sale after going through the appraisal procedures and advertising.*

Even if these withdrawals were more commonplace it would hardly prove that there was an existing Forest Service policy to maximize its gross sales proceeds. For it must be remembered that even with thousands of sellers, each seller will also have a "bottom price," analogous to the appraisal price, at which they would not sell whenever there was a likelihood of higher prices in the reasonably near future. To make the charge of "monopoly" stick, therefore, it would have to be demonstrated that the Forest Service has consciously managed its sales offerings with a design of enlarging its aggregate sales proceeds by narrowing its stumpage offerings. If an opinion may be expressed, if the Forest Service had really and consciously reduced its permissive cut in the past decade or so, during the period of intense housing demand, lumber prices, stumpage prices, and stumpage receipts might well have been substantially higher for a smaller volume of timber cut.

Thus, if those who argue in terms of monopoly desire to construct a defensible argument their criticism would have to be over the matter of the allowable cut versus the actual cut, as well as call attention to those cases in which sales offerings have been revoked because bids did not match up to appraisals. In the latter case, in some instances though not necessarily all, some valid criticism might be made against Forest Service procedures.

* See below, this Part.

The Time Period of Sales

Proceeding on the assumption that the Forest Service objective is to move the annual timber harvest, the question arises as to whether this must be accomplished with full precision and exactitude in a given year. For example, say that the goal for 1958 is 10 MMBF. Suppose, however, that 8 MMBF of it can be moved at a "reasonable" price but that to sell more, in view of a fall-off in housing, will reduce stumpage prices by, say, 20 percent compared to the past, or the likely near future, 1959, say. Ought the harvest be thrown onto the market regardless of the fact that it means a substantial proceeds loss?

It is clear that in a case of this nature, if private enterprise were in the same position, it would calculate the cost of carrying the item in inventory, amounting to the sacrifice of current earnings from withholding the stumpage compared to the potentially higher earnings of selling the stumpage in the future. Of course, if the next few years promised worse results from a proceeds standpoint a private firm would enlarge this year's cut.

This raises a basic issue for it entails that price and proceeds objectives may clash with forestry ends. Yet the conflict is not irreconcilable. As the year is no more than a calendar limitation, there is no reason why a longer view of objectives cannot be taken, extending to two, three, five, or even ten years. Surely in a period of war we do take an immediate view for victory and hence, cut timber at a pace in excess of any longer-run objective. A similar approach might be suggested here; although it need not be fully resolved at this time, perhaps some arbitrary rule is likely to be effective, recommending withholding, say, 10% of the allowable cut whenever prices appear to be, say, 20 percent lower than might be attained in a forthcoming year, and accelerating sales by the same amount when it is judged that future conditions of sale are likely to be less propitious.

Reports on Stumpage Withholdings

At so many turns, in so many issues, we have come up against a recognition of the importance of timber withholdings in judging the validity of certain criticisms of Forest Service stumpage pricing policy. Some information on these matters has recently been made available by regional officers and is entered at this point.

An office memorandum from Region 6 covering the calendar year 1957 indicates a total of 34 no-bid offerings of sales over \$2,000 in value. Of these, 13 were later sold under Regulation

S-12, leaving 21 unsold. The letter remarks: "We feel sure that the bulk of these have been reappraised at lower rates and sold."*

Although information is not provided on the aggregate sales value involved and relative importance of the total offerings unsold, the note declares that: "Our instructions to the field are not to withhold timber from the market but to reappraise at current rates and sell all offerings in an orderly manner." Further: "The only offerings which could possibly be construed as being withheld are a few which appraise in at a negative value under today's market," so that it was thought "futile to readvertise these at the present time" while "one or two others are felt to have received no bids because of faulty volumes or quality estimates." The latter were to be reappraised and readvertised "presumably at lower rates." Also: "all of the no-bid sales used profit ratios lower than our currently used average of 12%."

From Region 5, in a letter dated April 16, 1958 covering the calendar year 1957, there is listed only 5 "no-bid" sales. One dated April 26 was readvertised, appraised downward, and sold on June 24. Similarly, another was offered on June 4, reappraised, and sold on December 11; a third was offered on September 9 and sold at a lower rate on December 16. A fourth was offered on August 14 and sold on August 28, apparently without reappraisal. Only one of the offerings, then, appears not to have been sold during the calendar year; this appears to involve an appraisal of about \$45,000. The same letter also remarks: "The Region is not withholding from sale any timber in the hope of securing better prices if and when the market improves."

A similar letter was received dated April 16 from Region 1, declaring there was no withholding in the hope of better prices while listing 40 no-bid offerings in 1957 of which 9 appear to have been sold at a later date under Regulation S-12. About one-half of the no-bid instances involved tracts of less than 1,000 MBF.

According to this information withholdings appear to be practically nil in Region 5; in Regions 1 and 6 the same conclusion might be drawn though the subject deserves a somewhat fuller study.

A letter received from a forester of the Western Pine Association contains a brief statement of 9 no-bid situations in California with 5 cases for the year 1957.** Of these, all

* Letter dated April 11, 1958.

** The cases listed were ones known to him and did not purport to be a complete account of the matter.

but one was sold after periods of 2 to 6 months, with reappraisal downward as a rule. One offering of about \$46,000 was reported still unsold. Likewise, 4 cases for 1956 were reported with 3 apparently still unsold. Also noted was the failure of actual cut to approach the allowable cut in several forests.

Although the information detailed here is incomplete, it does not appear to be of such a nature as to suggest significant, much less substantial, withholdings or withdrawals of offerings. The vital remaining issue is one of whether actual cut can be brought closer to the allowable cut under existing conditions. Some comments on this have already been made.*

* See Part I above.

VIII. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations suggested by the foregoing study follow. While there is often only a shade separating the two, for what is a conclusion to one person can serve as a guide for a policy recommendation by another, I have sought to separate the lines by confining recommendations almost wholly to matters involving the collection and accumulation of data.

Conclusions

Thus, on this basis, the following conclusions suggest themselves:

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1. Forest Service sales, in value and volume, have grown at a rather phenomenal pace in the postwar years. Judged from the standpoint of results, Forest Service appraisal policies have not been ineffective. Problems would beset any enterprise, particularly a public one, in its growth from rather small to near giant dimensions.
 2. In terms of failures and bankruptcies in the lumber industry, the percentages have been usually stable in both value and numbers over the postwar period--1945-1956.
 3. From only fragmentary data, covering the period 1951 to 1954, it appears that the total value of assets in the Lumber and Wood Products industry has tended to decline. A fuller study ought to be made of this data, involving the question of whether the industry will, through time, be in a position to make its output contribution to a growing economy. The study would also involve the question of whether the industry's current capacity is adequate or excessive by expected near future demand estimates.
 4. According to the data available the rise in the ratio of stumpage prices to lumber prices since 1949 has departed from previous relationships.
 5. Stumpage prices are representative of the phenomenon of "derived-demand," wherein their prices reflect the prices of the ultimate products.
 6. It may be surmised that any likely change in the Forest Service appraisal techniques will probably have little or no effect on the vast majority of Forest Service sales. For example, in Fiscal Year 1955, of almost 27,342 sales, 26,686 were valued

at \$20,000 or less. Of the remaining 656 largest sales, most of these appeared in Regions 5 and 6, with about 22% of the total Forest Service receipts (in these areas) coming from bid situations in which the appraised price was approximately the sale price. Thus, it is possible to exaggerate the importance of appraisals: they are meaningful for perhaps about 30% of the Forest Service receipts. While this figure is a substantial one, some sense of proportion is warranted for it suggests that as much as a 10% rise or fall in appraisals will affect the total receipts of about \$100 million by perhaps 3% to 5%.

7. Criticism resting on ratios of bids to appraisals as indicative of under-appraisal in one-bidder situations is not conclusive: the relevant question is whether the appraisals have been conducted on approximately the same basis and whether the sale could have been consummated at higher appraisal prices. If sales cannot be made at a higher appraisal critics ought to indicate whether they would favor withholding the timber. Further study ought to be given to this matter.
8. The appraisal policy of the Forest Service, after some of the fog is lifted from the term "fair" prices, ought to be conceived as having a functional significance. The major objectives of price and appraisal policy would be: 1) to move the annual yield quota onto the market for harvesting; 2) to maintain a lumber industry of such present and prospective future size as to enable sustained yield programs to be met.
9. Contract terms other than price reflect what an economist would term the "surrounding conditions of sale." When these are made more rigorous, extra costs are usually experienced by the purchaser. To move the stumpage would thus necessitate lower prices. The writer is aware that the Forest Service does evaluate industry protests on contract terms, to consider whether modifications are feasible and whether they conform to desirable forestry objectives. This is, of course, always a continuing subject.

In industry spokesman, in at least one case, has suggested longer contract terms, extending to five years, say. Such arrangements have a part in a full sales program where special capital facilities have to be constructed.

10. Whatever appraisal techniques are used, timber stands will still be sold to the highest bidder. This raises some difficult questions in the case of "cutthroat competition" or in any program to foster small business.
11. Any attempt to hit the target of sustained yield will, ordinarily, drive lumber prices lower--or reduce private cuttings--or, on an upswing, restrain lumber price increases. Targets ought to be most nearly met under the latter conditions. The significance of this proposition is tempered by the relative unimportance of Forest Service timber in the total lumber output.
12. To approach stumpage sales-target levels might require important price differentials between certain regions. This ought to be understood and the Forest Service not criticized for adopting the only tactics that can enable it to accomplish cutting goals.
13. Differences in circumstances between areas are likely to require different appraisal tactics. Prices constitute the lever to raise or lower demand, to bring the actual cut close to the target levels. Hence, a rigid, undeviating pricing formula, except in the broadest outlines, is unlikely to work in all regions, or even in all parts of any region, in any given time interval, much less operate unaltered over time.
14. Tentative reflections suggest that the investment-value method of appraisal, though it has its place in the sale program, is neither generally feasible nor desirable for wide-spread application.
15. Over the period 1922-1953 the average ratio of profits (before taxes) to sales for nondurable goods manufacturing corporations averaged 6.2%, and for durable goods, 7.7%. After taxes, the respective figures were 3.9% and 4.5%. To net worth (before taxes) for the two categories the ratios were 12.4% and 16.1%; after taxes the figures were 7.4% and 8.2%.

For trading corporations the sales ratios were (before and after taxes) 2.6% and 1.6%. To net worth, 12.2% and 5.3%.

For construction corporations the figures for 1932-1952 averaged 2.8% and 1.1%. To net worth, 14.5% and 7.2%. The latter figures demonstrate

the possibility of a relatively good capital return despite a very low profit margin on sales.

Public utilities invariably show a higher profit margin on sales, often over 20%, though the relations to net worth are more stable and lower. The greater importance of plant and equipment in these highly "capital-using" industries is manifest in these ratios.

Profit margins (before taxes) in large corporations over the period 1951-1956 hover between 10% and 15% of sales, with the Food and Kindred product classification running closer to 8% to 10% and the Chemical industry showing a ratio of 18% to 25%.

Listed manufacturing corporations, over the 1942-1950 period, disclose a crazy-quilt, criss-cross pattern, with the range being from about 5% to 20%, and the average for the full period about 10%. The Lumber and Wood products industry generally falls in the middle of this range, averaging 11.7%. For 1951-1954, results seem to be very much the same, with the all-industry range being 2.5% to 17%, with the Lumber and Wood products category again in the middle of the pattern. (See Charts 12 and 13)

16. The ratio of profits (before taxes) to both sales and to stockholders' equity mounts as the asset size of the corporation increases, largely because of the greater importance of equipment relatively to labor as the size of the firm grows. This has some implications for appraisal policy when the ratio of capital use to labor differs among firms bidding on different stands.
17. Examining profit margins relative to sales in economic upswings and downswings, the almost universal rule is that on the up-side profit margins rise and fall in the economic descent. In this respect, the falling profit margins in the lumber industry in the last two years are not unusual.
18. Considering the high importance of labor costs as a percent of sales receipts, apparently running higher than in practically any other industry, efforts ought to be made to construct an index of cost movements for the lumber industry, perhaps on an annual basis. New data on the relative importance of labor costs also ought to be gathered.

19. The approximate profit ratios used in Forest Service appraisals conform reasonably well to what we might expect from previous data. This is a crude test of their reasonableness; strong efforts to amass actual profit data for the lumber industry are recommended.

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20. Any prospective purchaser of Forest Service timber will appraise stumpage on the basis of expected lumber prices and expected costs. Appraisal techniques which use historic price data, no matter how recent a past period it covers, will tend to overvalue stumpage on a falling lumber market, and undervalue it during a price rise. The possibility for correcting this influence lies in the use of judgment in applying the appraisal profit ratio. Interim price adjustments also serve to moderate the impact of changing price phenomena.
21. Where bidders for Forest Service timber contemplate a more valuable end-product use than surfaced dry lumber, even if all Forest Service logging cost data were accurate and past prices correctly reflected the future trend, overbids will still be common so long as lumber prices are used for appraisal purposes.
22. The economic value of stumpage to a fully integrated lumbering firm depends on its end-product receipts minus all processing costs. This fixes the stumpage ceiling that it can pay. What it will pay will be affected by its ability to buy alternate stands of timber, or even dry lumber in the market place.
23. The profit sum is inevitably a nebulous and vague component of the "allowable costs and profits" total required for arriving at a stumpage value. Pragmatic tests alone are useful for measuring its adequacy; a number of relevant considerations may be enumerated, each incomplete in itself but together providing sufficient data by which, with judgment and care, workable results may be secured.
24. Under certain conditions even zero stumpage prices cannot insure a "reasonable return on prudent investment value." This consideration alone illustrates that a formula based on investment value for use in appraisal work is neither general nor valid--unless below zero stumpage prices (= subsidies) are contemplated in these circumstances. An illustration is provided in the demise of street railways; where major errors are committed in investment estimates, profitable operation is simply not possible.

25. Where large operators bid for small timber stands, one reason for doing so may be to secure a more efficient total volume of operations. Where relevant, this fact might be included in appraisal techniques.
26. Unit production costs are likely to fluctuate with the scale of operations in view of different ratios of capital-labor use. The implication is that appraisals directed to the "average firm" must consider the cost data appropriate to the likely bidding firms. Where important discrepancies are revealed between offerings, a uniform profit ratio will be inequitable. In some situations a return-on-investment approach may be justified. For the cases envisaged there is no reason to suppose that the value of stumpage will be reduced as compared to situations in which more labor relative to capital is used.
27. Only in the one-bidder situation is the appraised price likely to be the market price. Whenever there is competitive bidding there will always tend to be overbids (= bids in excess of appraisals) so long as appraisals are geared to some "representative firm" and include: 1) longer-run profit allowances, in excess of short-run needs, 2) overlook the existence of integrated lumber firms, 3) are based on past lower lumber prices, 4) ignore economies of scale, and 5) omit favorable tax aspects such as in the treatment of capital gains.

This signifies that if the appraisal objective is to anticipate the final market price, with many bidders it is no trick to predict that bids will ordinarily exceed appraisals. This conclusion will be upset, ordinarily, only in a falling lumber market.

28. The quarterly rate adjustment clause gives greater assurance to operators in a falling lumber market, thus encouraging cutting activity on their part; it is likely to encounter more vocal resistance and objection in a rising lumber market.
29. For 1957 in Region 6, considering appraisals of \$20,000 or over the appraised price was literally the sales price in about 47% of the sales of the Forest Service (measured in value terms). Single bid situations, not unexpectedly, were most common in the appraisal class of \$100,000 or over. No bids, or a withdrawal of the offering, was also

most common in this category. The inference would be that competitive bidding is most readily stimulated in smaller sales offerings. For four or more bidder situations the excess of winning bid over appraisal runs above 50% in all of the classes. Bids were 50% or more above the appraisal in 16% of the cases.

30. In Region 5, for the same calendar year 1957, the appraisal price was the sales price in transactions involving 51% of the Forest Service receipts in appraisals of \$20,000 or over. The single bidder was again most common on the larger sales of \$100,000 or over--one bids also occurred in this grouping. In all appraisal categories the single-bid situation was somewhat more common than in Region 6. With two bidders (4 cases), due primarily to two cases the bid was about double the appraisal in the \$20,000 to \$50,000 class, 23% above the appraisal (4 cases) and 7% above the appraisal (5 cases) in the \$50,000 to \$100,000 and over classes, respectively.

Examining the ratio of the second-high bid to the appraisal, in 12 out of 30 cases the second bid was at or up to 10% in excess of the appraisal. In Region 6, this relationship occurred in 29 of the 96 cases. This indicates either the importance of the appraisal in determining bids or a not unreasonable presumption of the correctness of appraisals in foreshadowing near market prices in about 30% of the cases.

31. For Region 8, which uses sealed bids, for the 57 one-bidder cases involving appraisals of \$15,000 or higher, in 15 cases the bid was at the appraisal and in 24 of the cases, not more than 5% above. Thus 39 out of the 57 cases were at approximately the appraised price. Only 3 cases were above 15% in excess of the appraisal; none were above 25% of the appraisal. When actual bidders had reason to think competition would be forthcoming this record would not reflect unfavorably on the reasonableness of Forest Service appraisal; if they were aware that they were to be the only bidder the evidence is inconclusive. Again, the bid-appraisal ratio was higher in the cases where bidders were more numerous. However, in 75% of the cases, the bid-appraisal ratio was 120% or less.
32. In situations where only one bidder is expected, though sealed bids with concealed appraisals may often yield a return to the Forest Service in

excess of the appraisal, the drawback is that bids may sometimes be below appraisal. Either a rejection must then be made or a new bid invited. Study, however, ought to be given to the combination of concealed appraisals, sealed qualifying bids, followed by oral bidding. Some mild experimentation might also be made with this sequence.

33. Some data on the relation of overbids to species composition indicates that rather high bid-appraisal ratios occur on the less valuable species where a small absolute difference in bid and appraisal price can lead to significant percentage discrepancies. To substantiate criticisms of appraisals by appeals to bid-appraisal ratios on other timber stands, it would also have to be demonstrated that the species composition of the various stands was substantially similar. A sample study might be devoted to a breakdown of the relation between overbidding and species composition.
34. The use of transactions analysis for appraisal work appears to be a reasonable, feasible, even an ingenious approach. Some questions on its mechanics, especially its methods of averaging, have been raised. Most criticisms center about the construction of the "profit ratio"; the use of bid experience to test its reasonableness is logical. Some suggestions on the incorporation of bid experience into the method have been made. Further, while the principle of a uniform profit ratio can be supported there are several circumstances which will compel departures from it. There are also some cases in which the method may be inapplicable; the number of such situations may be rather few.
35. The Forest Service ought to promulgate a precise description of its current appraisal procedures and current use of transactions evidence. Under the latter heading there ought to be an explanation of how its averages are derived, the frequency with which they are revised, and the modifications for special local conditions. It might also be in the general interest if the Forest Service occasionally prepared some account for publication of actual appraisals in different size categories, indicating the resulting bid experience.
36. The use of a fixed profit ratio regardless of the size of the tract tends to make the acquisition of larger tracts more desirable so long as the

volume of equipment used is approximately the same. It is mistaken to suggest that the profit ratio is unrelated to the output scale: the mark-up of the small corner store as against the supermarket illustrates the point. Conversely, when more equipment is used and substituted for labor, the profit margin may have to be higher. The reduction is direct (primary wage). Costs might also elevate stumpage prices.

37. Whenever transactions analysis considers solely past bids in excess of appraisal for the purpose of revising profit ratios the effect must be to reduce profit ratios. This version of transactions analysis would obviously be subject to serious criticism; a more valid average or median bid ratio could be developed on the proviso of concealed appraisals, and bids below as well as above the appraisal entering into the average.
38. Over time appraisal procedure which takes into account average changes in efficiency neither penalizes superior performance nor gives comfort to more indolent or backward operations.
39. Arguments for using replacement cost estimates for depreciation allowances are neither stronger nor weaker than arguments for the use of original cost as the valuation base. A consistent formula from year to year seems alone to be required. A reasonable resolution would be for the Forest Service to permit an averaging of replacement cost and original cost data. Over time, as equipment wears out and is replaced, both estimates will approach one another more closely. Unless simple price-index correctives are used an estimate of replacement value will involve costly surveys by industry and inevitable checks by the Forest Service. This creates an appraisal problem of its own, perhaps transcending all the vexations of present stumpage appraisal work.
40. In principle, the argument that "high stumpage" causes "high lumber prices" is a delusion. If it was a valid proposition it would signify that falling lumber prices, as over the last two years, were caused by falling stumpage prices. One variant of this argument appeals to long-run considerations; this would be valid only if the sustained-yield objective was not being met even though attainable of achievement.

41. The criticism of the Forest Service as a "monopolist" hardly amounts to more than a case of name-calling: 1) it overstates the importance of Forest Service stumpage; 2) it understates the importance of alternate sources of supply; 3) it confuses the existence of a single seller of a particular product with the consequences of monopoly; 4) it ignores the important consideration that what is important, in the single-seller case, is its behavior rather than its potential power; 5) it forgets that if a given volume of timber is to be sold, whether 1 seller, 10,000 sellers or 10,000,000 sellers do so is largely immaterial to the price outcome.
42. Available evidence does not indicate that forest regions are withholding stumpage with the aim of securing high prices.

Recommendations

The following also suggest themselves:

1. For following trends in the lumber industry the various regions ought to report, on either a monthly or quarterly basis, the number of lumber firms failing, those merging and new firms appearing. To avoid a comprehensive and probably unnecessary statistical investigation, this tabulation could be limited to those firms which bid, frequently or occasionally, for Forest Service timber. These reports can be useful for background information and as a guide to appraisal policy. When significant changes in these totals manifest themselves, more elaborate studies would be required, as well as probable policy changes. Not only would this information commend itself to any business which wanted to know about its clientele but it is particularly important for a Government agency with responsibility for public policy.
2. A study on capital invested, and on the value of assets for the lumber industry, ought to be undertaken to demonstrate whether the industry is being maintained in adequate size or not, as judged by the evidence on the scale of the stock of capital (see Conclusions, point 3).
3. Some question has been raised as to the validity of a stumpage price index and whether it is strictly comparable to the usual price indexes. Some attention ought to be given to this matter and a study made of its significance by a competent economic statistician. A proper index ought to be prepared

if feasible in the light of cost and available data.

4. Data on the number of lumber firms, their cutting capacity, and their profit position, ought to be gathered for background information and for gauging over time the appropriateness of appraisal techniques.
5. Regions ought to report, preferably on a quarterly basis, on sales that were not made because appraisals were too high. The report ought to include those actual offerings on which no bids were received as well as those units which were not even processed because of a belief that no bids would be received at the estimated appraisal figure. Some indication should also be given of the extent to which these sales could be made, if, say, appraisals were 5% lower, 10% lower, etc. Though less essential, some guess might occasionally be made of the fall-off in sales if appraisals were 5% higher, 10% higher, etc.
6. Considering the industry's expressed interest in the use of rates of return on investment value for appraisal analysis, a separate memorandum embodying the virtues, defects, and feasibility of this pricing mechanism might be prepared. The present report covers this subject only briefly; it suggests, however, that in large negotiated transactions where the equipment-labor rates are above the industry average the approach has its place in appraisal determinations. In such instances it can be used in conjunction with profit ratio procedures as another indicator of the reasonableness.
7. An effort might be made to construct an index of cost movements in the lumber industry, based largely on the magnitude of labor costs. Annual data ought to be compiled. (See Conclusions, No. 21). Initially, this is likely to be too crude as to warrant publication but it might, when used with discrimination, be useful as a background for policy.
8. More study ought to be devoted to the effect of bidding by species.
9. Information on the relation of bids to appraisals, such as appear in Part V ought to be prepared annually. The information contained is worth the few days tabulating effort involved. Reasonably

continuing information would thus be on hand on changes in Forest Service market conditions and competition.

10. To counter the charge of monopoly, as well as for the information contained, there ought to be compiled an annual series indicating the importance of Forest Service stumpage for lumber end-products compared to other stumpage sources, especially private. It is surprising to find that this tabulation is not ready at hand considering the rather copious lumber statistics already published.
11. A series, however crude it may be initially, ought to also be available on the number, volume and value of private stumpage sales, for Regions 5 and 6, largely for the same purpose, to indicate the importance of alternate sources of timber supply. Sales data of this sort would indicate the access to stumpage by firms not owning timber reserves.

IX. STATISTICAL APPENDIX

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Business Failures in Mining and Manufacturing Industries, 1954-1956

Industrial Group	Number of Failures											
	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Lumber and Lumber Products	49	59	178	267	387	312	220	245	287	336	336	401
Mining--Coal, Oil, Misc.	17	14	12	21	73	26	38	42	41	42	55	42
Food and Kindred Products	14	23	108	180	299	261	209	164	165	179	165	188
Textile Mill Products and Apparel	19	27	108	169	346	420	397	388	472	543	506	537
Paper, Printing and Publishing	14	15	32	63	107	112	89	101	107	129	114	123
Chemicals and Allied Products	15	19	59	50	83	56	49	43	60	75	49	61
Leather and Leather Products	8	7	47	69	96	103	67	82	98	103	80	84
Stone, Clay and Glass Products	8	9	31	45	55	66	31	40	39	60	49	33
Iron, Steel and Products	24	26	76	83	150	71	40	50	66	115	120	139
Machinery	54	123	285	220	266	209	106	131	171	301	291	259
Transportation Equipment	19	39	50	45	82	62	18	44	60	51	47	64
Miscellaneous	39	95	289	269	387	376	269	251	291	348	390	354
Total	280	466	1,275	1,481	2,331	2,074	1,533	1,581	1,857	2,282	2,202	2,285

Source: Dun's Statistical Review.

Business Failures in Mining and Manufacturing Industries, 1954-1956

Industrial Group	Current Liabilities (thousands of dollars)											
	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Lumber & Lumber Products	1,754	2,385	14,156	11,903	18,932	11,295	15,262	11,758	14,092	18,584	13,658	22,898
Mining--Coal, Oil, Misc.	2,487	1,452	674	2,581	8,468	3,335	6,820	3,794	3,034	8,007	5,156	8,193
Food and Kindred Products	527	3,399	19,222	14,264	21,479	16,225	14,474	12,648	22,370	16,089	14,198	10,366
Textile Mill Products & Apparel	311	774	5,299	6,979	16,503	14,909	17,313	19,868	30,381	28,382	25,334	34,536
Paper, Printing & Publishing	640	470	1,147	3,486	5,778	5,396	5,963	7,038	10,687	12,274	6,760	7,542
Chemicals & Allied Products	261	1,501	9,985	3,531	2,745	5,601	6,056	3,937	7,292	5,634	3,454	12,607
Leather & Leather Products	240	213	2,673	2,947	4,689	4,106	2,944	4,553	7,109	6,868	4,358	5,519
Stone, Clay & Glass	366	1,193	1,727	2,746	4,708	2,940	591	1,886	2,082	2,232	1,821	4,720
Iron, Steel & Products	1,481	2,083	5,506	9,873	11,633	5,839	1,670	4,234	11,977	10,437	14,219	12,056
Machinery	3,644	10,930	53,155	38,267	24,602	10,330	10,360	19,680	29,753	37,874	37,278	30,172
Transportation Equipment	3,567	11,067	10,458	8,489	6,403	3,772	937	2,530	6,249	5,938	5,327	5,209
Miscellaneous	1,969	3,418	18,710	25,126	17,325	11,346	8,580	13,028	13,828	18,665	25,382	37,412
Total	17,247	38,887	142,727	130,292	143,265	95,094	90,970	104,954	158,854	171,284	156,945	191,230

Source: Dun's Statistical Review.

Value Added by Manufacture, Lumber and Products Compared with All Industries
Total, 1949-1954

(millions of dollars)

Industry	1949	1950	1951	1952	1953	1954
All Industries, Total	75,367	: 89,750	: 102,086	: 109,162	: 121,659	: 116,001
Lumber and Products (except furniture)	2,284	: 3,166	: 3,523	: 3,449	: 3,501	: 3,178
Logging and Logging Contractors	n. a.*	: n. a.	: 366	: 384	: 453	: 386
Lumber and Timber Basic Products	1,325	: 1,903	: 1,902	: 1,871	: 1,801	: 1,599
Millwork and Related Products	421	: 628	: 706	: 649	: 688	: 709
Wood Containers	178	: 208	: 232	: 214	: n. a.	: 211
Miscellaneous Wood Products	227	: 276	: 317	: 330	: 292	: 274

* n. a. = not available

Source: Bureau of the Census, Annual Survey of Manufactures.

Index of Average Prices for Stumpage Compared with BLS Wholesale Price Indexes of Lumber, Structural Steel, ^{a/} Cement, Structural Clay Products, ^{b/} and All Commodities (1947-49 = 100)

Year	Stumpage	BLS Wholesale Price Indexes				
		Structural		Structural		All
		Lumber	Steel	Cement	Clay Products	
1926	48.3	33.2	62.8	79.0	65.5	65.0
1927	48.6	30.9	59.5	75.4	62.7	62.0
1928	46.8	30.1	59.8	73.1	62.6	62.9
1929	49.0	31.2	61.6	70.4	61.8	61.9
1930	49.7	28.5	54.8	71.0	58.8	56.1
1931	46.9	23.1	52.2	59.1	54.8	47.4
1932	41.6	19.4	50.8	58.7	50.6	42.1
1933	36.7	23.5	52.2	69.6	51.9	42.8
1934	39.8	28.1	57.0	73.6	59.1	48.7
1935	43.9	27.2	57.8	73.3	58.6	52.0
1936	44.4	28.9	59.7	72.9	58.1	52.5
1937	42.5	33.1	71.7	70.4	61.2	56.1
1938	42.7	29.0	69.7	71.4	59.6	51.1
1939	44.7	31.0	67.4	72.2	59.9	50.1
1940	47.1	34.2	67.4	71.8	59.3	51.1
1941	47.6	40.7	67.4	72.7	61.4	56.8
1942	47.4	44.2	67.4	74.3	64.2	64.2
1943	62.6	47.0	67.4	74.2	64.9	67.0
1944	72.5	50.9	67.4	75.7	66.6	67.6
1945	70.6	51.5	67.4	78.6	73.6	68.8
1946	71.8	59.3	74.4	82.3	80.5	78.7
1947	73.0	94.5	84.5	91.3	91.7	96.4
1948	95.6	107.3	102.8	103.0	102.4	104.4
1949	131.2	98.2	112.6	105.8	105.9	99.2
1950	149.7	114.5	121.0	108.0	110.2	103.1
1951	174.1	123.6	128.4	116.4	117.8	114.8
1952	229.2	120.5	131.1	116.4	122.0	111.6
1953	233.4	119.3	138.2	122.2	128.1	110.1
1954	207.8	117.3	143.8	126.6	133.1	110.3
1955	190.8	124.4	151.9	131.4	140.1	110.7
1956	241.3	127.2	162.9	139.7	148.0	114.3

^{a/} Currently listed by the Bureau of Labor Statistics as "Structural Shapes, Carbon

^{b/} Prior to 1952, this item was listed as "Brick and Tile."

Volume and Value of Timber Cut in Region 6 for Sawtimber Species,

Pulpwood and Miscellaneous Convertible Products.

Fiscal Years 1954 and 1955

1954

Species/Product	Volume MBM	Percent of Cut	Value \$	Percent of Value
Douglas Fir-West Side	1,044,547	: 43.3 :	19,875,681	: 58.5
Other Species-West Side	712,211	: 29.5 :	4,590,009	: 13.5
Ponderosa Pine-East Side	390,291	: 16.2 :	7,880,379	: 23.2
Other Species-East Side	252,099	: 10.4 :	1,528,768	: 4.5
Pulpwood	2,763	: .1 :	4,656	: .0
Misc. Convertible Products	13,108	: .5 :	87,184	: .3
Total	2,415,019	: 100.0 :	33,966,677	: 100.0

1955

Species/Product	Volume MBM	Percent of Cut	Value \$	Percent of Value
Douglas Fir-West Side	1,188,772	: 45.1 :	21,146,981	: 56.7
Other Species-West Side	703,472	: 26.7 :	4,994,092	: 13.4
Ponderosa Pine-East Side	461,862	: 17.5 :	9,378,421	: 25.2
Other Species-East Side	259,564	: 9.9 :	1,687,516	: 4.5
Pulpwood	4,660	: .2 :	8,162	: .0
Misc. Convertible Products	14,794	: .6 :	63,485	: .2
Total	2,633,124	: 100.0 :	37,278,657	: 100.0

Source: Forest Service (Timber Management Division), U. S. D. A.

Region 6. Volume and Value of Timber Cut, By Species, 1956

Species	Volume MBF	Percent of Total	Value	Percent of Total
Western White Pine	15,311	: 0.6	: \$ 576,193	: 0.8
Ponderosa Pine	236,476	: 9.0	: 6,683,946	: 9.2
Douglas Fir-East Side	171,576	: 6.5	: 2,171,689	: 3.0
Douglas Fir-West Side	1,342,632	: 51.1	: 50,199,608	: 70.0
Other Species	<u>860,621</u>	: <u>32.8</u>	: <u>13,130,202</u>	: <u>17.0</u>
Total Sawtimber	2,626,616	: 100.0	: \$72,761,638	: 100.0

Volume and Value of Timber Cut in Region 5 for Sawtimber Species
and Other Products, Fiscal Years 1954 and 1955

1954

Species	Volume MBM	Percent of Cut	Value \$	Percent of Value
Ponderosa & Jeffrey Pine	232,794	35.9	5,492,774	59.2
Douglas Fir	132,080	20.4	746,081	8.0
Sugar & Western White Pine	74,675	11.5	2,169,325	23.4
Other Sawtimber Species	207,649	32.0	867,934	9.3
Other Products	<u>1,751</u>	<u>.2</u>	<u>8,877</u>	<u>.1</u>
Total for Region 5	648,949	100.0	9,284,991	100.0

1955

Species	Volume MBM	Percent of Cut	Value \$	Percent of Value
Ponderosa & Jeffrey Pine	304,412	36.4	5,954,043	59.7
Douglas Fir	183,379	21.9	965,016	9.7
Sugar & Western White Pine	93,273	11.2	2,441,033	24.5
Other Sawtimber Species	253,907	30.3	595,419	6.0
Other Products	<u>2,044</u>	<u>.2</u>	<u>10,481</u>	<u>.1</u>
Total for Region 5	837,015	100.0	9,965,992	100.0

Source: Forest Service (Timber Management Division), U. S. D. A.

Stumpage Prices for Selected Species: Dollars Per MBF

Year	Douglas Fir	Southern Pine	Sugar Pine	Ponderosa Pine
1945	: \$ 5.00	: \$ 9.30	: \$ 7.30	: \$ 5.60
1946	: 6.60	: 8.90	: 7.20	: 5.80
1947	: 9.90	: 10.90	: 12.50	: 8.30
1948	: 19.90	: 16.40	: 16.20	: 14.60
1949	: 11.10	: 19.70	: 18.90	: 17.60
1950	: 16.40	: 26.70	: 25.00	: 18.30
1951	: 25.40	: 34.60	: 40.40	: 33.60
1952	: 25.80	: 38.50	: 36.40	: 27.40
1953	: 20.20	: 34.20	: 30.20	: 25.90
1954	: 16.20	: 29.70	: 31.20	: 27.20
1955	: 28.90	: 32.00	: 30.00	: 26.10

Source: Letter from the Assistant Secretary of Agriculture, transmitting a report on "Price Trends and Relationships For Forest Products," (June 13, 1957), p. 51.

Index Numbers of Stumpage Prices Per MBF for Selected

Species: 1947-1949 = 100

Year	Douglas Fir	Southern Pine	Sugar Pine	Ponderosa Pine
1945	: 36.7	: 59.4	: 46.0	: 41.5
1946	: 48.4	: 56.8	: 45.4	: 42.9
1947	: 72.6	: 69.6	: 78.8	: 61.5
1948	: 146.0	: 104.7	: 102.1	: 108.1
1949	: 81.4	: 125.8	: 119.1	: 130.4
1950	: 120.3	: 170.5	: 157.5	: 135.6
1951	: 186.4	: 220.9	: 254.6	: 248.9
1952	: 189.3	: 245.8	: 229.4	: 203.0
1953	: 148.2	: 218.4	: 190.3	: 191.9
1954	: 118.9	: 189.7	: 196.6	: 201.5
1955	: 212.0	: 204.3	: 189.0	: 193.3

Source: Computed from the preceding table.

Profit Ratios to Sales and Net Worth Realized by Corporations
Producing Durable Goods vs. Corporations Producing
Nondurable Goods, 1919-1926

Year	Percentage Ratios to Sales of				Percentage Ratios to Net Worth of			
	Profit Before Taxes		Profit After Taxes		Profit Before Taxes		Profit After Taxes	
<u>Corporations Producing Durable Goods</u>								
1919	:	14.25	:	9.70	:	16.87	:	11.49
1920	:	9.91	:	7.86	:	11.67	:	9.26
1921	:	3.36	:	2.10	:	2.26	:	1.41
1922	:	10.72	:	9.60	:	9.05	:	8.10
1923	:	11.69	:	10.41	:	12.19	:	10.85
1924	:	10.32	:	9.10	:	9.64	:	8.50
1925	:	11.72	:	10.30	:	11.90	:	10.46
1926	:	11.35	:	9.92	:	12.55	:	10.97
<u>Corporations Producing Nondurable Goods</u>								
1919	:	8.82	:	6.62	:	19.08	:	14.32
1920	:	5.79	:	4.45	:	11.94	:	9.17
1921	:	2.84	:	1.96	:	3.89	:	2.68
1922	:	8.13	:	7.27	:	11.11	:	9.94
1923	:	7.34	:	6.55	:	10.19	:	9.10
1924	:	6.96	:	6.18	:	10.23	:	9.08
1925	:	7.70	:	6.84	:	11.93	:	10.59
1926	:	7.97	:	7.08	:	11.85	:	10.53

Computed from data in Ralph C. Epstein, Industrial Profits in the United States, National Bureau of Economic Research, 1934, p. 617 ff. Corporations producing durable goods are those in three of Epstein's major groups: Lumber; Stone, Clay and Glass; and Metals. Corporations producing nondurable goods are thus in all the other manufacturing groups.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Corporate Earnings---Preliminary Draft, National Bureau of Economic Research, Table 13/Page 51.

Profit Ratios to Sales and to Net Worth
Corporations Manufacturing Nondurable Goods, 1922-1953

Year	Percentage Ratios to Sales of		Percentage Ratios to Net Worth of	
	Profit Before Taxes	Profit After Taxes	Profit Before Taxes	Profit After Taxes
1922	6.40	5.56		
1923	6.18	5.41		
1924	4.95	4.27		
1925	5.97	5.16		
1926	5.79	5.01	8.43	7.29
1927	5.15	4.44	7.42	6.41
1928	6.14	5.43	8.81	7.79
1929	6.17	5.52	8.85	7.91
1930	2.89	2.38	3.54	2.92
1931	.59	.19	.59	.19
1932	-1.22	-1.59	-1.03	-1.35
1933	2.82	2.18	2.66	2.06
1934	3.88	3.24	4.44	3.71
1935	4.88	4.20	6.78	5.84
1936	5.75	4.85	8.93	7.52
1937	4.73	3.93	7.60	6.31
1938	3.14	2.45	4.30	3.36
1939	5.56	4.59	8.16	6.75
1940	6.27	4.64	9.64	7.15
1941	8.60	5.16	16.15	9.68
1942	8.94	4.14	18.47	8.56
1943	9.78	4.09	21.25	8.89
1944	9.06	3.72	19.90	8.16
1945	7.50	3.24	15.98	6.91
1946	9.64	6.02	22.47	14.04
1947	8.78	5.52	22.59	14.20
1948	8.01	5.02	20.18	12.66
1949	6.36	3.96	13.95	8.69
1950	8.89	5.10	20.72	11.88
1951	8.10	3.70	19.99	9.13
1952	6.41	3.03	14.96	7.06
1952	7.73	4.01	18.51	9.61
1953	8.07	4.27	18.68	9.90

Computed from data in Table 16 of Dr. Hultgren's study.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Earnings--Preliminary Draft, National Bureau of Economic Research, Table 24/Page 72.

Profit Ratios to Sales and to Net Worth
Corporations Manufacturing Durable Goods, 1922-1953

Year	Percentage Ratios to Sales of		Percentage Ratios to Net Worth of	
	Profit Before Taxes	Profit After Taxes	Profit Before Taxes	Profit After Taxes
1922	7.40	6.37		
1923	8.61	7.55		
1924	7.37	6.34		
1925	8.84	7.68		
1926	8.86	7.60	10.12	8.68
1927	6.73	5.72	7.55	6.41
1928	7.99	6.97	9.37	8.17
1929	8.88	7.92	11.08	9.87
1930	3.38	2.73	2.97	2.40
1931	-3.61	-3.97	-2.27	-2.49
1932	-15.47	-15.64	-6.37	-6.44
1933	-1.97	-2.49	-1.05	-1.33
1934	2.94	2.22	2.11	1.99
1935	6.46	5.51	6.30	5.37
1936	8.41	7.01	10.46	8.72
1937	8.40	6.90	11.59	9.52
1938	3.54	2.65	3.37	2.52
1939	7.65	6.28	9.06	7.43
1940	10.92	7.46	15.84	10.82
1941	14.83	7.06	30.32	14.42
1942	14.50	5.16	36.00	12.80
1943	13.05	4.29	36.81	12.10
1944	10.45	3.50	28.38	9.50
1945	7.23	2.69	16.03	5.96
1946	6.62	3.68	11.10	6.17
1947	10.32	6.30	23.19	14.17
1948	10.96	6.80	25.33	15.72
1949	9.78	5.95	19.54	11.88
1950	13.72	7.33	31.38	16.77
1951	12.20	4.99	30.15	12.32
1952	9.72	4.02	23.78	9.82
1952	10.78	4.59	26.52	11.29
1953	10.29	4.26	27.23	11.27

Computed from data in Table 15 of Dr. Hultgren's study.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Earnings--Preliminary Draft, National Bureau of Economic Research, Table 23/Page 71.

Profit Ratios to Sales and to Net Worth
Trading Corporations, 1922-1952

Year	Percentage Ratios to Sales of		Percentage Ratios to Net Worth of	
	Profit Before Taxes	Profit After Taxes	Profit Before Taxes	Profit After Taxes
1922	2.62	2.24		
1923	3.11	2.70		
1924	2.44	2.10		
1925	2.70	2.33		
1926	2.26	1.91	7.34	6.20
1927	2.16	1.82	6.69	5.62
1928	2.28	1.98	7.00	6.08
1929	1.88	1.62	5.78	5.01
1930	-0.04	-.22	-.10	-.52
1931	-1.57	-1.73	-3.81	-4.19
1932	-3.20	-3.34	-6.61	-6.90
1933	0.16	-.11	.36	-.25
1934	1.30	1.00	3.94	3.05
1935	1.55	1.25	5.42	4.37
1936	2.29	1.87	8.76	7.16
1937	1.94	1.56	7.50	6.03
1938	1.17	.86	3.81	2.82
1939	2.02	1.62	7.18	5.75
1940	2.40	1.76	9.45	6.92
1941	3.72	2.19	16.87	9.92
1942	4.74	2.16	20.35	9.29
1943	5.43	2.30	23.06	9.78
1944	5.39	2.23	23.18	9.57
1945	5.15	2.24	22.58	9.81
1946	5.85	3.73	31.17	19.85
1947	4.99	3.18	28.45	18.09
1948	4.26	2.69	23.41	14.78
1949	2.97	1.82	14.59	8.97
1950	4.15	2.44	21.76	12.76
1951	3.33	1.65	17.48	8.68
1952	2.67	1.32	13.74	6.77

Computed from data in Table 17 of Dr. Hultgren's study.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Earnings--Preliminary Draft, National Bureau of Economic Research, Table 25/Page 73.

Profit Ratios to Sales and to Net Worth
Construction Corporations, 1932-1952

Year	Percentage Ratios to Sales of		Percentage Ratios to Net Worth of	
	Profit Before Taxes	Profit After Taxes	Profit Before Taxes	Profit After Taxes
1932	-6.35	-6.66	-6.99	-7.32
1933	-5.21	-5.52	-4.92	-5.21
1934	-1.95	-2.29	-2.48	-2.91
1935	0.43	- .07	.71	- .12
	:	:	:	:
1936	2.02	1.38	4.71	3.22
1937	2.03	1.43	5.23	3.67
1938	1.52	.98	3.76	2.42
1939	1.61	1.09	4.89	3.30
1940	2.89	1.97	9.72	6.62
	:	:	:	:
1941	5.35	2.91	23.12	12.60
1942	7.40	2.94	38.38	15.26
1943	6.27	2.23	28.76	10.22
1944	4.58	1.65	15.80	5.68
1945	4.00	1.80	12.88	5.82
	:	:	:	:
1946	5.59	3.58	21.02	13.47
1947	5.69	3.67	27.65	17.84
1948	6.29	4.00	32.15	20.45
1949	5.37	3.30	24.36	14.97
1950	4.93	2.77	23.04	12.98
	:	:	:	:
1951	4.04	1.95	20.84	10.05
1952	4.03	1.97	20.74	10.16

Computed from data in Table 18 of Dr. Hultgren's study.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Earnings--Preliminary Draft, National Bureau of Economic Research, Table 26/Page 74.

Profit Ratios to Sales and to Net Worth
Bell Telephone System, 1920-1954

Year	Percentage Ratios to Sales of		Percentage Ratios to Net Worth of	
	Profit Before Taxes	Profit After Taxes	Profit Before Taxes	Profit After Taxes
1920	12.43	10.66	6.00	5.15
1921	16.01	13.61	7.57	6.44
1922	18.54	15.93	7.94	6.82
1923	19.42	16.65	7.98	6.84
1924	19.45	16.40	7.74	6.53
1925	22.01	18.53	8.85	7.45
1926	22.79	18.96	9.21	7.67
1927	22.27	18.68	8.81	7.39
1928	22.78	19.72	8.79	7.61
1928	22.78	19.72	12.31	10.65
1929	23.13	20.41	12.22	10.78
1930	20.80	18.41	9.21	8.16
1931	20.23	18.13	7.51	6.73
1932	16.82	14.76	5.60	4.91
1933	15.00	13.14	4.65	4.07
1934	16.26	14.18	5.11	4.45
1935	18.01	15.81	6.04	5.31
1935	18.01	15.81	6.04	5.31
1936	22.71	19.88	8.45	7.40
1936	22.71	19.88	8.45	7.40
1937	21.32	18.39	8.49	7.32
1938	18.84	15.61	7.62	6.31
1939	21.66	18.03	9.27	7.71
1940	24.01	18.68	10.79	8.40
1941	23.55	15.36	11.65	7.00
1942	24.30	11.34	13.62	6.36
1943	25.57	11.20	16.02	7.02
1944	25.60	9.98	16.90	6.59
1945	22.66	9.53	15.80	6.65
1946	15.08	10.28	11.08	7.55
1947	10.79	7.44	8.17	5.64
1948	12.56	8.73	10.41	7.23
1949	12.50	8.32	10.27	6.83
1950	18.39	11.00	15.16	9.07
1951	19.65	10.32	15.70	8.25
1951	19.65	10.32	15.70	8.25
1952	20.05	10.36	15.21	7.86
1953	21.53	11.13	15.61	8.07
1954	22.44	11.81	15.46	8.13

Computed from data in Table 22 of Dr. Hultgren's study.

Profit Ratios to Sales and to Net Worth
Electric Utilities, 1926-1953

Year	Percentage Ratios to Sales of		Percentage Ratios to Net Worth of	
	Profit Before Taxes	Profit After Taxes	Profit Before Taxes	Profit After Taxes
1926	:	28.27	:	:
1927	:	30.12	:	:
1928	:	31.14	:	:
1929	:	32.20	:	:
1930	:	31.47	:	:
1931	:	31.54	:	:
1932	:	29.54	:	:
1933	:	24.63	:	:
1934	:	22.87	:	:
1935	:	23.53	:	:
1936	:	24.07	:	:
1937	:	25.06	:	:
1937	22.31	20.10	7.53	6.78
1938	21.58	19.11	7.30	6.47
1939	23.57	20.21	8.31	7.12
1940	24.42	19.59	8.99	7.21
1941	24.99	17.40	9.82	6.83
1942	25.59	15.24	10.69	6.37
1943	25.58	14.49	11.64	6.60
1944	24.40	14.02	11.73	6.74
1945	23.87	14.50	12.08	7.34
1946	24.77	16.72	13.25	8.94
1947	21.95	14.98	12.80	8.74
1948	20.35	13.60	12.67	8.47
1948	20.35	13.60	12.67	8.47
1949	22.27	14.93	13.43	9.01
1950	23.75	14.87	14.26	8.93
1951	24.46	13.44	14.88	8.17
1952	26.57	14.46	16.03	8.72
1953	26.56	14.43	16.12	8.76

Computed from data in Table 20 of Dr. Hultgren's study.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Earnings--Preliminary Draft, National Bureau of Economic Research, Table 28, Page 76.

Profit Ratios to Sales and to Net Worth
Gas Companies, 1937-1953

Year	Percentage Ratios to Sales of				Percentage Ratios to Net Worth of			
	Profit Before Taxes		Profit After Taxes		Profit Before Taxes		Profit After Taxes	
1937	:	23.26	:	12.81	:	10.58	:	5.82
1938	:	22.20	:	11.10	:	10.00	:	5.00
1939	:	24.32	:	13.08	:	11.54	:	6.21
1940	:	26.29	:	13.42	:	13.00	:	6.64
	:		:		:		:	
1941	:	28.23	:	12.76	:	14.52	:	6.56
1942	:	28.42	:	10.91	:	15.86	:	6.09
1943	:	28.80	:	10.85	:	16.94	:	6.38
1944	:	29.42*	:	11.73	:	17.35	:	6.91
1945	:	29.42*	:	11.81	:	18.09	:	7.26
	:		:		:		:	
1946	:	27.12	:	13.33	:	17.39	:	8.55
1946	:	19.76	:	13.33	:	12.67	:	8.55
1947	:	18.41	:	12.39	:	12.83	:	8.63
1948	:	16.85	:	11.17	:	12.74	:	8.44
1949	:	16.75	:	11.67	:	12.75	:	8.89
1950	:	19.10	:	12.38	:	15.72	:	10.19
	:		:		:		:	
1951	:	19.58	:	11.16	:	17.53	:	9.99
1952	:	18.06	:	10.11	:	16.65	:	9.32
1953	:	16.88	:	9.52	:	16.03	:	9.04

* More exactly, 29.425 in 1944 and 29.420 in 1945.

Computed from data in Table 21 of Dr. Hultgren's study.

Source: Dr. Thor Hultgren, "Sales vs. Profits," Business Cycles and Earnings--Preliminary Draft, National Bureau of Economic Research, Table 29, Page 77.

Profit Ratios to Sales and to Net Worth
Railroads, 1919-1954

Year	Percentage Ratios to Sales of				Percentage Ratios to Net Worth of			
	Profit Before Taxes		Profit After Taxes		Profit Before Taxes		Profit After Taxes	
1919	:	9.50	:	8.69	:	4.92	:	4.50
1920	:	7.80	:	6.98	:	4.76	:	4.26
	:		:		:		:	
1921	:	6.40	:	5.69	:	3.43	:	3.05
1922	:	7.61	:	6.66	:	4.08	:	3.57
1923	:	10.06	:	8.82	:	6.00	:	5.26
1924	:	10.69	:	9.42	:	5.79	:	5.10
1925	:	12.89	:	11.45	:	6.82	:	6.06
	:		:		:		:	
1926	:	14.40	:	12.67	:	7.43	:	6.54
1927	:	12.34	:	10.97	:	5.86	:	5.21
1928	:	14.30	:	12.88	:	6.51	:	5.86
1929	:	15.71	:	14.29	:	7.02	:	6.38
1930	:	10.68	:	9.92	:	3.97	:	3.69
	:		:		:		:	
1931	:	3.46	:	3.22	:	1.04	:	.97
1932	:	-4.06	:	-4.45	:	-.93	:	-1.02
1933	:	0.23	:	-.19	:	.05	:	-.04
1934	:	-0.09	:	-.52	:	-.02	:	-.13
1935	:	.78	:	.23	:	.21	:	.06
	:		:		:		:	
1936	:	4.84	:	4.07	:	1.57	:	1.32
1937	:	3.12	:	2.35	:	1.06	:	.80
1938	:	-2.92	:	-3.45	:	-.87	:	-1.02
1939	:	3.15	:	2.33	:	1.07	:	.79
1940	:	5.79	:	4.40	:	2.14	:	1.63
	:		:		:		:	
1941	:	12.61	:	9.35	:	5.81	:	4.31
1942	:	22.19	:	12.08	:	13.99	:	7.61
1943	:	24.38	:	9.64	:	17.92	:	7.09
1944	:	20.89	:	7.07	:	15.32	:	5.18
1945	:	8.49	:	5.06	:	5.68	:	3.38
	:		:		:		:	
1946	:	3.55	:	3.76	:	2.01	:	2.13
1947	:	8.95	:	5.52	:	5.69	:	3.51
1948	:	11.85	:	7.22	:	8.09	:	4.93
1949	:	8.16	:	5.10	:	4.82	:	3.02
1950	:	14.62	:	8.28	:	9.36	:	5.30
	:		:		:		:	
1951	:	12.13	:	6.67	:	8.25	:	4.54
1952	:	13.70	:	7.92	:	9.22	:	5.33
1953	:	13.46	:	8.46	:	8.76	:	5.51
1954	:	9.60	:	7.19	:	5.31	:	3.98

Computed from data in Table 19 of Dr. Hultgren's study.

Sales and Profits Before Taxes of Large Manufacturing Corporations, in
Selected Industries (millions of dollars)

Industry	1951	1952	1953	1954	1955	1956
<u>Foods and Kindred Products (28 Corps.)</u>						
Sales	4,909	5,042	5,411	5,476	5,833	6,300
Profits Before Taxes	473	453	465	462	499	561
Ratio: Profits to Sales	9.6	9.0	8.6	8.4	8.6	8.9
<u>Chemicals and Allied Products (26 Corps.)</u>						
Sales	5,882	5,965	6,373	6,182	7,222	7,726
Profits Before Taxes	1,490	1,259	1,308	1,153	1,535	1,500
Ratio: Profits to Sales	25.3	21.1	20.5	18.7	21.3	19.4
<u>Petroleum Refining (14 Corps.)</u>						
Sales	5,078	5,411	5,883	6,015	6,556	7,185
Profits Before Taxes	911	728	841	751	854	916
Ratio: Profits to Sales	17.9	13.5	14.3	12.5	13.0	12.7
<u>Primary Metals and Products (39 Corps.)</u>						
Sales	12,507	11,564	13,750	11,522	14,952	16,062
Profits Before Taxes	2,098	1,147	1,817	1,357	2,377	2,366
Ratio: Profits to Sales	16.8	9.9	13.2	11.8	15.9	14.7
<u>Machinery (27 Corps.)</u>						
Sales	6,168	7,077	8,005	7,745	8,477	9,798
Profits Before Taxes	1,000	971	1,011	914	912	943
Ratio: Profits to Sales	16.2	13.7	12.6	11.8	10.8	9.6
<u>Automobiles and Equipment (15 Corps.)</u>						
Sales	12,707	13,038	16,611	14,137	18,826	16,336
Profits Before Taxes	1,950	1,982	2,078	1,789	3,023	1,940
Ratio: Profits to Sales	15.3	15.2	12.5	12.7	16.1	11.9

Source: Federal Reserve Bulletin.

Operating Profit as a Percent of Sales for Listed Manufacturing Corporations, 1942-1950

Industry	1950	1949	1948	1947	1946	1945	1944	1943	1942
All Manufacturing	14.3	10.9	12.4	11.7	9.0	9.2	10.8	11.8	13.4
Beverage Industries	12.8	11.7	13.1	14.1	14.7	14.2	15.5	16.5	16.1
Building Materials and Equipment	18.2	14.3	16.3	16.1	12.5	10.2	12.3	13.6	15.7
Chemicals and Allied Products	20.3	15.4	14.7	15.6	14.8	13.1	15.9	17.4	18.8
Communication Equipment & Related Products									
Drugs, Medicines, Cosmetics, Soaps	13.0	6.9	8.3	7.8	3.2	8.9	11.7	13.2	13.3
Food and Kindred Products	16.0	10.3	12.5	13.1	15.0	13.8	15.6	17.1	16.4
Household Machines, Appliances and Utensils	4.8	4.3	4.3	5.4	6.6	5.9	6.5	6.6	6.3
Leather and Leather Products									
Lumber and Wood Products	15.5	11.2	14.1	14.9	11.4	12.1	12.1	12.2	11.1
Machinery, Parts and Equipment	7.3	4.6	6.9	9.5	6.5	7.7	8.3	10.6	9.9
Metals: Iron and Steel	11.5	8.4	11.9	13.6	11.3	11.6	12.5	10.9	13.3
Non-ferrous Metals	15.9	12.3	12.8	12.7	5.3	10.9	13.5	15.5	18.7
Oil Refining	16.1	12.2	11.8	10.9	7.2	5.9	8.9	10.7	14.1
Paper and Allied Products	18.5	13.5	19.9	20.6	14.5	11.9	15.2	17.3	20.1
Printing, Publishing and Allied Industries	15.3	12.6	18.1	15.5	12.7	10.5	13.1	14.0	12.7
Professional and Scientific Instruments (Photographic and Optical)	19.4	15.9	18.4	20.7	14.6	12.0	14.0	14.3	16.6
Rubber Products	10.1	9.6	10.9	12.4	14.3	17.3	16.9	15.2	10.7
Textile Mill Products and Apparel									
Tobacco Products	17.4	13.2	15.5	14.1	13.1	14.2	17.2	17.9	20.1
Transportation Equipment	11.6	6.4	8.6	8.3	11.3	9.8	10.7	11.5	11.4
Miscellaneous Manufacturing	14.4	10.2	17.5	16.1	16.3	12.7	13.1	13.0	14.1
	10.4	9.7	9.2	8.2	7.7	8.1	9.1	10.7	12.2
	16.0	12.4	11.5	9.5	.8	7.4	8.8	9.5	12.0
	13.7	11.3	11.4	11.5	9.3	11.4	12.7	13.5	15.7

Source: Economic Almanac (1956), pp. 278-281.

Value Added by Manufacture for Major Industry Groups, 1949-1954

(millions of dollars)

Industry	1949	1950	1951	1952	1953	1954
Food and Kindred Products	9,426	10,104	10,579	11,340	11,938	13,453
Tobacco Manufactures	779	806	856	868	987	988
Textile Mill Products	4,741	5,642	5,421	5,257	5,412	4,672
Apparel & Related Products	4,245	4,176	4,699	4,849	5,415	5,033
Lumber & Products (except furniture)	2,284	3,166	3,523	3,449	3,501	3,178
Furniture & Fixtures	1,412	1,667	1,804	1,904	2,047	1,952
Pulp, Paper & Products	2,777	3,438	4,180	3,883	4,463	4,542
Printing & Publishing	4,659	4,907	5,289	5,660	5,916	6,194
Chemicals & Products	5,848	7,237	8,165	8,539	9,320	9,150
Petroleum & Coal Products	1,744	2,139	2,687	2,619	2,795	2,569
Rubber Products	1,195	1,620	1,729	1,744	2,021	1,903
Leather & Leather Products	1,387	1,499	1,475	1,597	1,711	1,637
Stone, Clay & Glass Products	2,451	3,138	3,561	3,531	3,753	3,810
Primary Metal Industries	5,710	7,951	9,769	9,051	11,004	9,405
Fabricated Metal Products	4,834	6,211	7,139	7,168	8,144	7,766
Machinery (except electrical)	7,689	8,765	11,219	12,807	13,381	12,313
Electrical Machinery	3,902	4,815	5,753	6,873	7,876	7,399
Transportation Equipment	7,054	8,547	9,789	12,042	14,534	13,734
Instruments & Related Products	1,123	1,389	1,608	1,995	2,169	2,104
Miscellaneous Manufactures (including ordnance)	2,109	2,534	2,842	3,984	5,272	4,199
All Industries, Total	75,367	89,750	102,086	109,162	121,659	116,001

Source: Bureau of the Census, Annual Survey of Manufactures.

Employment and Wages in Manufacturing Industries, 1951-1954

Industry	1951		1952		1953		1954	
	Av.No. (000)	Tot.Sal. & wages (million dollars)	Av.No. (000)	Tot.Sal. & wages (million dollars)	Av.No. (000)	Tot.Sal. & wages (million dollars)	Av.No. (000)	Tot.Sal. & wages (million dollars)
All Industries, Total	15,613	: 55,992	: 16,061	: 61,141	: 17,093	: 68,590	: 16,135	: 66,011
Food and Kindred Products	1,474	: 4,819	: 1,480	: 5,098	: 1,455	: 5,266	: 1,650	: 6,211
Tobacco Manufactures	94	: 230	: 93	: 241	: 95	: 253	: 95	: 260
Textile Mill Products	1,195	: 3,438	: 1,135	: 3,343	: 1,158	: 3,455	: 1,022	: 2,985
Apparel & Related Products	1,123	: 2,955	: 1,143	: 3,079	: 1,227	: 3,358	: 1,197	: 3,211
Lumber & Products (except furn.)	770	: 2,015	: 74	: 2,072	: 720	: 2,087	: 649	: 1,941
Furniture & Fixtures	336	: 1,077	: 332	: 1,123	: 361	: 1,259	: 339	: 1,194
Pulp, Paper & Products	495	: 1,823	: 482	: 1,877	: 533	: 2,180	: 529	: 2,215
Printing & Publishing	765	: 3,068	: 773	: 3,267	: 760	: 3,387	: 802	: 3,600
Chemicals & Products	703	: 2,784	: 739	: 3,117	: 768	: 3,400	: 741	: 3,402
Petroleum & Coal Products	218	: 970	: 220	: 1,036	: 229	: 1,140	: 217	: 1,102
Rubber Products	253	: 963	: 255	: 1,042	: 270	: 1,140	: 247	: 1,062
Leather & Leather Products	354	: 945	: 361	: 1,016	: 375	: 1,099	: 357	: 1,028
Stone, Clay & Glass Products	529	: 1,828	: 510	: 1,842	: 506	: 1,949	: 494	: 1,947
Primary Metal Industries	1,244	: 5,137	: 1,240	: 5,215	: 1,288	: 6,002	: 1,119	: 5,108
Fabricated Metal Products	1,035	: 3,988	: 1,008	: 4,124	: 1,118	: 4,765	: 1,040	: 4,488
Machinery (except electrical)	1,604	: 6,729	: 1,651	: 7,380	: 1,691	: 7,876	: 1,543	: 7,175
Electrical Machinery	877	: 3,193	: 957	: 3,750	: 1,096	: 4,425	: 951	: 3,928
Transportation Equipment	1,469	: 6,067	: 1,650	: 7,423	: 1,912	: 8,987	: 1,709	: 8,304
Instruments & Related Products	253	: 1,001	: 279	: 1,180	: 285	: 1,232	: 270	: 1,189
Misc. Manufactures (incl ordnance)	519	: 1,711	: 682	: 2,375	: 844	: 3,232	: 700	: 2,669
Administrative & Auxiliary	303	: 1,250	: 328	: 1,543	: 400	: 2,098	: 464	: 2,992

Source: Bureau of the Census, Annual Survey of Manufactures.

Capital Invested, Corporate Manufacturing, 1948-1952

(millions of dollars)

Industry

	1948	1949	1950	1951	1952
Food, Beverages and Tobacco	14,165	14,235	16,062	17,337	17,509
Food and Beverages	11,848	11,902	13,608	14,712	14,815
Tobacco Manufactures	2,316	2,333	2,454	2,624	2,694
Textiles and their Products	8,921	8,821	10,550	11,130	10,725
Textile Mill Products	6,298	6,284	7,475	8,097	7,641
Apparel & Fabric Products	2,624	2,537	3,076	3,033	3,084
Leather and Products	1,213	1,179	1,348	1,344	1,351
Rubber Products	1,731	1,669	1,947	2,267	2,547
Lumber and Furniture Products	3,610	3,601	4,342	4,694	4,818
Lumber and Wood Products	2,546	2,536	3,002	3,277	3,318
Furniture and Fixtures	1,064	1,065	1,340	1,417	1,500
Paper and Allied Products	3,554	3,666	4,294	4,958	5,152
Printing and Publishing	3,499	3,666	3,966	4,283	4,450
Chemicals & Petroleum Products	23,164	24,238	25,223	28,797	30,583
Chemicals and Allied Products	8,555	9,089	10,286	11,971	12,576
Petroleum and Coal Products	14,608	15,148	14,937	16,827	18,007
Stone, Clay and Glass Products	2,725	2,768	3,216	3,627	3,759
Metal Products and Processes	37,297	36,317	42,399	52,363	58,941
Primary Metal Industries	9,855	9,886	11,243	12,737	14,594
Fabricated Metal Products					
(including ordnance)					
Electrical Machinery	5,110	4,968	5,879	6,917	7,147
Machinery (except electrical)	4,724	4,417	5,430	6,851	8,111
Automobiles	9,124	8,958	10,306	12,955	13,865
Transportation equipt., other	5,858	5,667	6,780	8,316	9,603
Miscellaneous Manufacturing	2,626	2,422	2,761	4,586	5,621
Instruments & Related Products	3,659	3,650	4,232	4,924	5,161
Other	1,182	1,242	1,599	2,011	2,250
	<u>2,477</u>	<u>2,408</u>	<u>2,632</u>	<u>2,913</u>	<u>2,912</u>
Total Corporate Manufacturing	103,539	103,809	117,578	135,724	144,997

Sources: The Conference Board; Treasury Department;
Economic Almanac (1956), p. 296.

Total Assets of All Manufacturing Corporations by Industry,
End of Year Estimates, 1951-1954

(millions of dollars)

Industry Group	1951	1952	1953	1954
<u>All Manufacturing</u>	158,144	: 165,965	: 170,966	: 175,065
Food	17,618	: 17,108	: 17,037	: 17,159
Tobacco Manufactures	2,694	: 2,778	: 2,808	: 2,874
Textile Mill Products	9,080	: 8,964	: 8,497	: 8,480
Apparel and Finished Textiles	3,354	: 2,948	: 2,685	: 2,547
Lumber and Wood Products	3,590	: 3,541	: 3,307	: 3,328
Furniture and Fixtures	1,735	: 1,675	: 1,595	: 1,638
Paper and Allied Products	6,005	: 6,301	: 6,549	: 7,085
Printing and Publishing (except Newspapers)	2,977	: 3,036	: 3,122	: 3,242
Chemicals and Allied Products	13,617	: 14,536	: 15,012	: 15,550
Products of Petroleum and Coal	20,917	: 22,743	: 24,327	: 26,041
Rubber Products	3,010	: 3,140	: 3,163	: 3,191
Leather and Leather Products	1,450	: 1,447	: 1,384	: 1,370
Stone, Clay and Glass Products	4,581	: 4,708	: 4,965	: 5,262
Primary Non-ferrous Metals	5,623	: 6,019	: 6,480	: 6,651
Primary Iron and Steel Industries	12,447	: 12,689	: 13,382	: 13,471
Fabricated Metal Products	6,978	: 7,353	: 7,662	: 7,725
Machinery	14,119	: 15,556	: 15,415	: 14,865
Electrical Machinery	8,055	: 9,085	: 9,853	: 9,678
Transportation Equipment (except Motor Vehicles and Parts)	4,349	: 5,240	: 5,521	: 6,737
Motor Vehicles and Parts	11,035	: 12,060	: 12,703	: 12,872
Instruments: Goods; Watches and Clocks; Photographic and Optical	2,297	: 2,422	: 2,788	: 2,732
Miscellaneous Manufacturing	2,610	: 2,615	: 2,709	: 2,565

Sources: Federal Trade Commission; Securities and Exchange Commission--Quarterly
Financial Reports (Economic Almanac (1956), pp. 287-292).

Capital Invested Per Production Worker, All Manufacturing Industries, 1948-1952

(dollars)

Industry	1948	1949	1950	1951	1952
Food, Beverages and Tobacco	11,955	12,388	14,183	15,162	15,405
Food and Beverages	11,049	11,421	13,173	14,104	14,313
Tobacco Manufactures	22,099	23,444	26,472	27,874	28,256
Textiles and their Products	4,204	4,450	5,070	5,407	5,387
Textile Mill Products	5,068	5,691	6,404	7,084	7,131
Apparel and Fabric Products	3,157	3,095	3,567	3,562	3,601
Leather and Products	3,538	3,643	4,079	4,251	4,215
Rubber Products	8,388	9,187	9,912	10,731	12,111
Lumber and Furniture Products	4,123	4,555	4,994	5,207	5,592
Lumber and Wood Products	4,241	4,680	5,147	5,270	5,688
Furniture and Fixtures	3,833	4,249	4,640	5,054	5,367
Paper and Allied Products	8,868	9,557	10,506	11,592	12,405
Printing and Publishing	7,944	8,433	9,002	9,497	9,793
Chemicals and Allied Products	16,852	19,237	21,368	22,891	23,962
Petroleum	55,597	60,574	64,640	70,382	76,358
Stone, Clay and Glass Products	6,580	7,056	7,706	8,089	8,852
Metal Products and Processes	8,016	8,920	9,488	10,172	11,121
Primary Metal Industries	9,235	10,733	10,944	11,384	14,122
Fabricated Metal Products (incl. ordnance)	6,576	7,251	7,520	7,856	7,718
Electrical Machinery	7,457	8,220	8,443	9,224	10,285
Machinery (except electrical)	7,970	9,389	10,344	10,854	11,333
Automobiles	9,059	9,047	9,817	11,893	15,064
Transportation Equipment, other	7,004	7,108	8,458	9,107	8,338
Miscellaneous Manufacturing	6,762	7,521	8,144	8,818	9,227
Instruments and Related Products	6,187	7,317	9,023	9,624	10,267
Other	7,054	7,623	7,720	8,369	8,601
Total Manufacturing	8,815	9,718	10,423	11,212	11,980

Sources: The Conference Board; Treasury Department; Bureau of Labor Statistics;
 Interstate Commerce Commission
Economic Almanac (1956), p. 298.

Labor Costs as a Percent of Sales in Manufacturing, 1941-1945 inclusive

Industry	No. of Corpo- rations	1941 1942 1943 1944 1945				
		1941	1942	1943	1944	1945
Food Products	445	6.9	6.5	7.3	8.0	8.6
Beverages	144	7.0	7.2	7.6	7.6	7.9
Tobacco	32	5.1	5.4	5.5	5.8	5.6
Textile Mill Products	283	22.4	21.6	22.6	22.7	23.0
Cotton Textile	111	22.5	21.2	21.8	22.6	22.8
Apparel and other Finished Products						
made from Fabrics	127	23.0	21.8	22.9	23.1	23.5
Leather and Leather Products	152	21.8	21.3	21.8	22.7	23.5
Lumber and Timber Basic Products	106	23.7	23.6	27.0	27.3	28.2
Rubber Products	61	14.9	20.4	22.2	23.6	22.1
Furniture and Finished Lumber Products	194	20.8	21.1	23.1	23.0	23.1
Paper and Allied Products	309	17.1	18.6	19.3	19.9	20.6
Chemicals and Allied Products	306	9.2	9.9	10.9	11.1	11.9
Printing, Publishing, and Allied Ind.	97	23.8	23.7	23.9	23.7	23.9
Petroleum and Coal Products	48	5.3	5.9	6.1	5.9	6.4
Stone, Clay and Glass Products	178	22.0	22.6	25.2	26.1	26.2
Iron, Steel and their Products	591	20.7	22.4	25.4	26.6	26.5
Non-ferrous Metals and their Products	94	14.7	18.1	20.6	20.9	19.1
Electrical Machinery	104	27.9	29.8	28.9	28.3	27.5
Machinery (except electrical)	475	21.1	22.4	23.9	24.5	23.8
Automobiles and Equipment	81	18.6	23.3	25.4	23.8	23.3
Transportation Equipment, except						
Automobiles	38	22.3	25.9	27.2	26.5	28.2
Other Manufacturing	131	22.8	22.7	26.4	26.5	25.5

Sources: Federal Trade Commission
Economic Almanac (1956), p. 240.

Employment of Production and Related Workers in Manufacturing Industries, 1947-1956

(thousands of workers)

Industry	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Lumber and Wood Products, Total	781	755	678	743	769	719	698	637	679	672
Sawmills & Planing Mills	459	444	401	432	440	407	385	348	365	358
Furniture & Fixtures	300	308	278	321	311	309	320	291	311	319
Stone, Clay & Glass Products	442	449	414	442	474	448	460	432	461	470
Primary Metal Industries, Total	1074	1081	933	1036	1133	1044	1131	987	1085	1096
Blast Furnaces, Steel Works & Rolling Mills	518	537	477	533	560	487	560	493	545	533
Fabricated Metal Products	822	805	710	810	874	848	930	841	894	888
Electrical Machinery	706	657	558	670	769	817	925	793	822	871
Transportation Equipt., Total	1048	1036	984	1036	1220	1334	1543	1328	1408	1358
Automobiles	649	655	635	702	708	644	767	624	746	652
Food & Kindred Products	1209	1187	1155	1143	1146	1137	1136	1102	1097	1105
Textile Mill Products	1252	1280	1134	1200	1175	1101	1090	976	984	966
Apparel & Finished Textiles	1030	1056	1038	1065	1068	1075	1103	1044	1077	1083

Source: Bureau of Labor Statistics.

Inventories of All Manufacturing Corporations, by Industry,
End of Year Estimates, 1951-1954

(millions of dollars)

Industry Group	1951	1952	1953	1954
<u>All Manufacturing</u>	43,396	44,128	44,967	43,290
Food	5,857	5,703	5,397	5,180
Tobacco Manufactures	2,154	2,187	2,238	2,269
Textile Mill Products	3,009	2,663	2,549	2,475
Apparel and Finished Textiles	1,385	1,107	1,036	939
Lumber and Wood Products	857	838	762	765
Furniture and Fixtures	583	523	497	476
Paper and Allied Products	1,068	1,060	1,058	1,116
Printing and Publishing (except Newspapers)	605	563	565	587
Chemicals and Allied Products	3,182	3,180	3,089	3,142
Products of Petroleum and Coal	2,478	2,680	2,803	2,739
Rubber Products	1,005	1,060	1,033	1,030
Leather and Leather Products	612	527	533	512
Stone, Clay and Glass Products	872	849	890	895
Primary Non-ferrous Metals	1,001	1,117	1,314	1,239
Primary Iron and Steel Industries	2,162	2,428	2,578	2,450
Fabricated Metal Products	2,242	2,279	2,505	2,279
Machinery	4,969	5,161	5,187	4,512
Electrical Machinery	2,848	2,994	3,255	2,813
Transportation Equipment (except Motor Vehicles and Parts)	1,843	2,330	2,263	3,226
Motor Vehicles and Parts	2,919	3,237	3,577	2,973
Instruments: Goods; Watches and Clocks; Photographic and Optical	841	813	941	875
Miscellaneous Manufacturing	906	830	898	798

Sources: Federal Trade Commission; Security and Exchange Commission--Quarterly
Financial Reports (Economic Almanac (1956), pp. 287-292).

Manufacturers' Expenditures for New Plant and New Equipment,
By Major Industry Groups, 1951-1955

(millions of dollars)

<u>Industry</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>Total</u> <u>1951-1955</u>
All Industries, Total	7,782	7,953	8,048	8,202	8,235	40,220
Food and Kindred Products	723	541	593	801	821	3,479
Tobacco Manufactures	18	22	29	28	27	124
Textile Mill Products	414	330	264	230	269	1,507
Apparel and Related Products	69	55	61	77	86	348
Lumber and Products (except furniture)	240	180	183	236	311	1,150
Furniture and Fixtures	55	55	60	62	79	311
Paper and Allied Products	435	384	445	533	577	2,374
Printing and Publishing Industries	244	189	199	237	261	1,130
Chemicals and Allied Products	1,088	1,162	1,092	1,021	841	5,204
Petroleum and Coal Products	450	613	858	784	601	3,306
Rubber Products	117	127	132	129	127	632
Leather and Leather Products	22	19	25	29	37	132
Stone, Clay and Glass Products	343	270	282	312	508	1,715
Primary Metal Industries	1,336	1,619	1,212	901	990	6,058
Fabricated Metal Products	360	338	446	444	509	2,097
Machinery (except electrical)	652	678	755	734	670	3,489
Electrical Machinery	320	347	406	355	358	1,786
Transportation Equipment	664	712	710	1,003	854	3,943
Instruments and Related Products	85	77	90	99	110	461
Miscellaneous Manufactures	146	235	206	178	187	952

Source: Bureau of the Census, Annual Survey of Manufactures.

Net Earnings, Corporate Manufacturing, 1948-1952

(millions of dollars)

Industry	1948	1949	1950	1951	1952
Food, Beverages and Tobacco	1,027	: 987	: 1,107	: 817	: 7,618
Food and Beverages	879	: 830	: 953	: 692	: 629
Tobacco Manufactures	147	: 157	: 155	: 125	: 120
Textiles and their Products	1,046	: 426	: 820	: 474	: 235
Textile Mill Products	896	: 361	: 672	: 422	: 176
Apparel and Fabric Products	150	: 65	: 148	: 52	: 60
Leather and Leather Products	72	: 44	: 86	: 36	: 51
Rubber Products	117	: 68	: 191	: 144	: 108
Lumber and Furniture Products	429	: 222	: 506	: 372	: 276
Lumber and Wood Products	330	: 152	: 380	: 286	: 197
Furniture and Fixtures	99	: 69	: 127	: 86	: 79
Paper and Allied Products	464	: 305	: 514	: 495	: 376
Printing and Publishing	332	: 293	: 298	: 265	: 259
Chemicals and Petroleum Products	1,926	: 1,320	: 1,955	: 1,693	: 1,193
Chemicals and Allied Products	917	: 881	: 1,282	: 1,008	: 782
Petroleum and Coal Products	1,009	: 439	: 674	: 684	: 411
Stone, Clay and Glass Products	308	: 285	: 416	: 309	: 248
Metal Products and Processes	4,213	: 3,480	: 5,275	: 4,232	: 3,608
Primary Metal Industries	1,016	: 734	: 1,189	: 1,053	: 651
Fabricated Metal Products (incl. ordnance)	613	: 374	: 635	: 579	: 444
Electrical Machinery	500	: 379	: 686	: 533	: 554
Machinery (except electrical)	1,023	: 752	: 1,059	: 1,033	: 922
Automobiles	940	: 1,143	: 1,519	: 864	: 835
Transportation Equipment, other	120	: 98	: 186	: 170	: 202
Miscellaneous Manufacturing	289	: 208	: 369	: 316	: 270
Instruments and Related Products	113	: 90	: 146	: 146	: 144
Other	176	: 118	: 223	: 169	: 126
Total Corporate Manufacturing	10,222	: 7,637	: 11,538	: 9,153	: 7,372

Sources: The Conference Board; Treasury Department;
Economic Almanac (1956), p. 296.

Net Earnings, Corporate Manufacturing, 1948-1952

(percent of capital invested)

Industry	1948	1949	1950	1951	1952
Food, Beverages and Tobacco	7.25	6.94	6.89	4.71	4.27
Food and Beverages	7.42	6.97	7.00	4.70	4.24
Tobacco Manufactures	6.35	6.75	6.30	4.77	4.44
Textiles and their Products	11.72	4.83	7.77	4.26	2.19
Textile Mill Products	14.23	5.74	8.99	5.21	2.30
Apparel and Fabric Products	5.70	2.55	4.81	1.72	1.93
Leather and Leather Products	5.91	3.75	6.41	2.71	3.78
Rubber Products	6.78	4.08	9.79	6.36	4.25
Lumber and Furniture Products	11.87	6.16	11.66	7.93	5.72
Lumber and Wood Products	12.95	6.01	12.64	8.74	5.93
Furniture and Fixtures	9.30	6.50	9.46	6.04	5.26
Paper and Allied Products	13.07	8.31	11.96	9.99	7.30
Printing and Publishing	9.49	7.99	7.51	6.18	5.81
Chemicals and Petroleum Products	8.32	5.44	7.75	5.88	3.90
Chemicals and Allied Products	10.72	9.69	12.46	8.42	6.21
Petroleum and Coal Products	6.91	2.90	4.51	4.07	2.28
Stone, Clay and Glass Products	11.29	10.30	12.95	8.52	6.61
Metal Products and Processes	11.29	9.58	12.44	8.08	6.12
Primary Metal Industries	10.31	7.42	10.57	8.27	4.46
Fabricated Metal Products (incl. ordnance)	12.01	7.52	10.80	8.38	6.21
Electrical Machinery	10.59	8.59	12.64	7.78	6.83
Machinery (except electrical)	11.21	8.39	10.28	7.97	6.65
Automobiles	16.05	20.17	22.41	10.39	8.70
Transportation Equipment, other	4.57	4.06	6.75	3.70	3.58
Miscellaneous Manufacturing	7.89	5.69	8.72	6.41	5.22
Instruments and Related Products	9.55	7.26	9.14	7.27	6.39
Other	7.09	4.88	8.47	5.81	4.32
Total Corporate Manufacturing	9.87	7.36	9.81	6.74	5.08

Sources: The Conference Board; Treasury Department;
Economic Almanac (1956), p. 297.





